

COMPUTERWORLD

INSIDE

In Depth — Simple steps for breaking the software development logjam. Page 89.

Product Spotlight — DOS applications make the leap to Unix. Page 77.

VP Planner users lose out as Paperback Software agrees to pull spreadsheet off the market in settlement of Lotus copyright infringement suit. Page 7.

A potential successor to VGA that IBM is reputedly keeping in the wings has display-card manufacturers waiting for a signal on whether it poses a new PC graphics standard. Page 4.

The financial muddle: Thin DEC profit brings investor smiles. Page 8. Strong IBM bottom line discredited by storm warnings. Page 116.

Commerce Department warned against proposed European computer security standard; threat to U.S. industry cited by advisory group. Page 115.

D&B Software points the way to next-generation merger of MSA, McCormack & Dodge software lines. Page 6.

Netview upgrade pricing proves too tangled a web for users to figure out individual costs. Page 117.

VAX 9000 users on VIP list

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp.'s VAX 9000 mainframe arrives at its 1-year-old mark this week, its reputation a bit tarnished by shipping delays but with sales into commercial accounts coming on stronger than DEC officials said they expected.

The company is also exhibiting an increasingly IBM-like reputation for customer service in mainframe accounts.

From jetting replacement disk drive controllers into Muncie, Ind., at 2 a.m. to stationing three DEC employees at a new mainframe customer site, DEC seems determined to do whatever it takes to keep these users content.

"It was worth the wait," said Michael Guider, vice-president of network and information services at Litel Telecommunications.

tions Corp. in Columbus, Ohio, which received one of the first VAX 9000 Model 210s. "DEC's ability to resolve problems has been outstanding."

During DEC's first fiscal quarter from July through September, the company said it delivered 76 mainframes, mainly

low-end Model 210s but including a handful of 410s and 420s. Two-thirds of them landed in commercial applications, while the remaining one-third found a home in technical or scientific uses — just about the reverse of what DEC officials had expected.

Continued on page 8

Revenge of the mini makers

	Processor	Memory	Disk	Price
NCR 3445 (entry)	1 x 486	4M bytes	327M bytes	\$20,495
DEC AD 433MP (entry)	1 x 486	8M bytes	209M bytes	\$17,500
NCR 3345	1 x 486	64M bytes	680M bytes	\$54,185
DEC AD 433MP	1 x 486	64M bytes	618M bytes	\$45,960
NCR 3445 (high-end)	1 x 486	64M bytes	3.3G bytes	\$84,785
DEC AD 433MP	2 x 486	64M bytes	3G bytes	\$78,517

All 1486 chips in this table are 33-MHz

Source: Gartner Group, Inc.

CW Chart: Doreen St. John

DEC last week became the latest vendor to offer up Intel-based multiuser Unix systems, with prices undercutting NCR's recent 3000 line. Story, page 8.

Repository, Systemview teams take separate paths

BY ROSEMARY HAMILTON
CW STAFF

CHICAGO — Two of the strategic architectures IBM has designed for key roles in its enterprise-wide management scheme do not adhere to a consistent data model, IBM officials conceded last week.

Systemview, the recently announced architecture for data center operations and systems management, does not conform to the entity relationship structure of Repository Manager/MVS, the key software component of the AD/Cycle application development architecture, the officials confirmed. While there is little short-term impact for users, the long-term implications could be significant for any user who hopes to unite the two environments someday.

IBM's stated goal is to provide a repository-based world that integrates information concerning various data processing activities, including application development and systems management.

AD/Cycle, announced in September 1989, is IBM's plan for an integrated application development environment. An initial version of Repository Manager/MVS was released earlier this year and is installed at a small number of select customer sites. Systemview was rolled out as part of the System/390 announcement last month. IBM is scheduled to release initial

Continued on page 116

USAF computer crime unit flies solo

BY MICHAEL ALEXANDER
CW STAFF

WASHINGTON, D.C. — On Feb. 20, 1989, U.S. Army Specialist Four Michael Peri, then 21, slipped into East Germany totting a stolen laptop computer and four disks containing classified information about the deployment of tanks and helicopters along the boundary between the two Germanys.

When Peri returned 12 days later, he confessed to being absent without leave but denied that the laptop, which he brought back, had contained military secrets. Hard-pressed to find enough evidence to prosecute Peri for espionage, Army authorities asked the Air Force

Office of Special Investigation's unique computer crime unit to look at the laptop. The Army had no special agent in Europe who was trained to analyze computer equipment for evidence.

"It appeared at the time [that Army investigators] were stymied and unable to prove anything," said Lt. Col. William T. Cobb, chief of directorate investigative support at AFOSI, headquartered at Bolling Air Force Base in Washington, D.C.

The AFOSI computer crime unit dispatched one of 12 computer crime investigators that it keeps stationed at Air Force

Japan gets first look at IBM 486

U.S. intro promised before Comdex/Fall

BY RICHARD PASTORE
CW STAFF

In what may be a sign of the growing market clout of Japan, a major IBM product was unveiled in Japan weeks before the expected U.S. debut of similar systems. Japanese versions of the long-rumored Personal System/2 Model 90 and 95 servers were made public earlier this month by IBM's Japan office.

Boasting about IBM's decision to unveil such key products in Japan first, IBM Japan Ltd. Vice-President Nobuo Mii announced two Intel Corp. i486-based models and added that the i486-based PS/2s will debut in the U.S. before Comdex/Fall '90 next month.

According to *Computerworld Japan*, Mii described a floor-standing system with a 33-MHz i486 chip that incorporates IBM's Micro Channel Architecture. The unit can be configured with 4M to 16M bytes of memory and 160M-byte or 320M-byte hard disks. A 25-MHz desktop model offers the same bus, memory and drive options.

Continued on page 4

bases around the globe to Fulda, West Germany, where Peri was stationed. There, the investigator unearthed sensitive information stored in hidden files in the laptop and on the disks. In June

1989, Peri was convicted of espionage and sentenced to 30 years in prison.

The Peri case illustrates that with the exception of the Air Force, which operates the only military agency assigned solely to investigating crimes involving computers, the military seems ill-prepared to cope with computer-related crime. Special agents that are employed by the

Continued on page 115

#630*****5-DIGIT 48106
#UIU7ZE300M039068#
UNIVERSITY MICROFILMS INT
UNIVERSITY MICROFILMS INT
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106
8637

NEWSPAPER



IN THIS ISSUE

NEWS

4 IBM has yet to find a 'home' for its to-be-announced Extended Graphics Array controller — a potential successor to the VGA standard.

6 Dun & Bradstreet spreads a comforting migration message to users fearful of the future of applications.

7 Pinning its hopes on Release 3.1 of 1-2-3, Lotus is expecting the spreadsheet upgrade to lift it out of its revenue rut.

8 After a quick dip into the red, DEC broke the surface for the third quarter with a modest \$26 million profit.

10 Two mainstay MV systems are bowing out at Data General to make room for its MV/30000 platform.

12 Following the winding road to flexible nationwide ISDN, AT&T will offer long-distance connectivity to its Centrex customers.

14 Wang is getting the hang of open systems with its newly introduced Open/Server connectivity plan.

115 A proposed European computer security standard could spell insecurity for U.S. computer vendors.

117 Even IBM salespeople are dismayed by the unexpected complexity of Netview Version 2's pricing structure.

Quotable

"In 1992, when they have the United States of Europe, they are going to start acting like a cohesive group of states."

WILLIS WARE
RAND CORP.

On international computer security efforts. See story page 115.

SYSTEMS & SOFTWARE

25 Users can't agree on what reverse engineering is — but they like it.

29 Weary of wading through a warehouse full of paperwork, a nuclear research facility in Idaho is waking up to imaging.

PCs & WORKSTATIONS

39 Users greet Intel's i486-based machines with a surge of joy, thanks to the chip's extra power boost.

43 Deaf students at Gallaudet University 'listen' and learn with PCs.

NETWORKING

53 Although not quite as prolific as a rabbit, IBM is multiplying options to Netview/PC.

MANAGER'S JOURNAL

67 The Body Shop coordinates information technology with the human touch.

COMPUTER INDUSTRY

93 No one ever promised campaign software vendors a rose garden market.

PRODUCT SPOTLIGHT

77 Getting used to Unix on the desktop means shopping for a graphical user interface and fitting the new operating system into your existing environment.

IN DEPTH

89 Learn four simple lessons for speeding up software development. By Todd Hixon and Dan Ginsburg.

DEPARTMENTS

6, 115 News Shorts

18 Advanced Technology

22 Editorial

72 Book Review

76 Calendar

99 Computer Careers

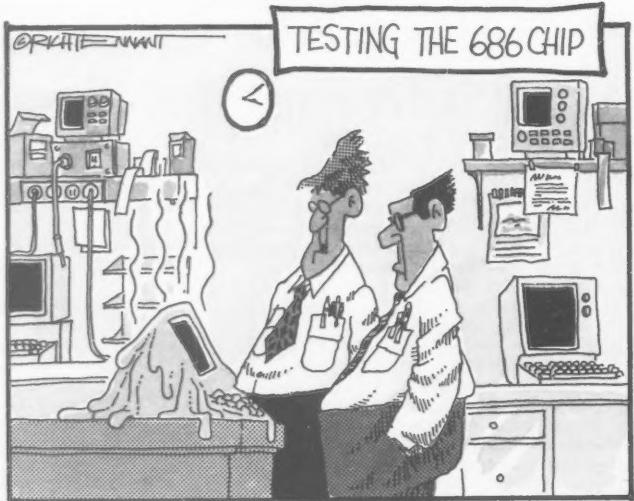
113 Training

108 Marketplace

114 Stocks

118 Trends

The Fifth Wave



EXECUTIVE BRIEFING

■ IBM's top-of-the-line Personal System/2 has been introduced in Japan, marking the first time an IBM product of such importance has hit Japan before it has hit the U.S. The Model 90 and 95 file servers, which are based on the 33-MHz Intel i486 chip, are expected to debut in the U.S. before Comdex/Fall '90 next month. Although the U.S. pricing structure will be different, the basic hardware configuration should be similar. **Page 1.**

■ Congress has criticized the Resolution Trust's information system as inadequate. Legislators say the corporation that was created to clean up the savings and loan crisis has failed to form a cohesive information or systems acquisition strategy. They say they are concerned that the inadequate IS strategy will be unable to provide Congress with sufficient data to judge the success or failure of its crisis resolution efforts. **Page 117.**

■ IBM's Systemview and Repository Manager architectures are not fully compatible from a data management standpoint, IBM conceded. The inconsistency poses a potential long-term problem for AD/Cycle users seeking enterprise-wide data sharing. **Page 1.**

■ After 20 years, AFIPS will dissolve itself at the end of the year. One director admitted that the society "has outlived its usefulness" since the demise of the National Computer Conference in 1987. **Page 4.**

■ Quarterly financial results found that Lotus and Apple profits are falling to the ground, DEC is inching up from its earlier loss, and IBM is healthy — but with question marks. **Pages 7, 8, 12 and 116.**

■ Charles H. Mayer, First Boston's new CIO, says he hopes to decentralize applications development among the investment firm's four business units. Like many others, the company is seeking competitive success through business rather than technology breakthroughs. **Page 67.**

■ The U.S. armed forces seem to be ill-prepared to cope with computer-related crimes. To investigate a major espionage case, for example, the Army had to turn to the Air Force for help. Officials question whether the military can deal effectively with threats from both internal hackers and foreign agents. **Page 1.**

■ Thanks to new connectivity features, IBM's Netview is becoming viable in multivendor environments. However, Netview/PC users such as Aetna, GE and Union Pacific say the network management system is fine without the new interfaces. **Page 53.**

■ Reviews are mixed for Unix playing on the corporate desktop. The operating system is getting raves from some users for its high speed and low cost, while big names from the DOS applications world are beginning to pop up in Unix. The trouble is, users say that the old favorites don't seem to be quite the same in the new setting. **Page 77.**

■ Colleges look to IS directors to teach information systems management, but there are obstacles and drawbacks to choosing the professional career track. Obtaining a Ph.D., taking a hefty pay cut and facing a roomful of students are but a few. **Page 99.**

■ On-site this week: Networked PCs are serving as telephones for deaf students at Gallaudet University in Washington, D.C. They are also a major classroom learning tool. **Page 43.** Forty years' worth of paper records will eventually be converted to a Wang imaging system at EG&G's nuclear research facility in Idaho Falls, Idaho. In an unusual twist, the Wang system will be connected to an IBM 3090 Model 200. **Page 29.**

If DB2 Is The Answer, What The Heck Was The Question?

Beginning to wonder about betting your company's future on DB2?

Wouldn't you like to know how IBM's information management approach will address the major problems and issues you'll face in the 90s?

We think you would. So, we've developed a check-list of what's most important to you.

So you can clearly see what you can expect from IBM.

And what you can expect from us.

	IBM	CA
INVESTMENT PROTECTION: Runs applications without change from...	DL/1 ✓ IMS ✓ VSAM ✓ TOTAL ✓ CA-IDMS ✓ CA-DATACOM ✓	
PORTABILITY Runs identically on...	MVS ✓ MVS/XA ✓ ✓ MVS/ESA ✓ ✓ VSE ✓ VM ✓ PC-DOS ✓ PC LAN ✓	
STANDARDS	ANSI SQL ✓ ✓ FIPS ✓ ✓ SAA ✓ ✓ NAS ✓	
DISTRIBUTED DATABASE	Remote Request ✓ ✓ Distributed Request ✓ Replication ✓ Partitioning ✓	
INTEGRATION	Dictionary ✓ w/Systems Security ✓	
PROVEN: Supports tens of thousands of mission-critical applications		✓

As the world's leading independent software company, Computer Associates can give you more.

Much more.

To begin with CA-IDMS®/DB and CA-DATACOM/DB® are more practical, productive and proven than DB2. Offering you a clearly superior alternative.

Our comprehensive software

engineering solutions and integrated life-cycle support are ready today including: 4GLs; one of the industry's most successful COBOL development environments; application generators; knowledge-based systems and products for project estimation and change management.

In addition, our information management solution is built upon the Computing Architecture For The 90s which can free you from hardware constraints. All of your mission-critical

applications can run on multiple platforms and operating systems from mainframe to midrange to PC.

CA90s also protects the massive investment you've made in your existing applications with transparency software that allows you to run your present applications unchanged using our relational database technology.

Altogether, it's a smarter, more practical approach to information management.

And one that's readily available today.

Which leaves just one question for everyone who's still patiently waiting for IBM...

What are you waiting for?



**COMPUTER
ASSOCIATES**

Software superior by design.

IBM mulls successor to VGA

BY MICHAEL FITZGERALD
CW STAFF

IBM has developed a powerful successor to its Video Graphics Array (VGA) personal computer display standard but is apparently still struggling over what to do with it.

Sources who have attended demonstrations and briefings on the unreleased Extended Graphics Array (XGA) controller say the 16-bit video card is well-positioned to succeed both the 4-bit VGA and the more expensive 8514/A controllers at the top of IBM's graphics line. XGA will reportedly give users better resolution, a faster screen refresh rate, substantially reduced flicker and far better color display than VGA.

However, sources said IBM is still debating whether to announce XGA as a commodity in its Personal System/2 Model 90 and PS/2 Model 95 machines or position it as an expensive high-end option for graphics-intensive applications. IBM announced Japanese versions of the Models 90 and 95 in Japan earlier this month and said they would be announced in the U.S. before Comdex/Fall '90 begins on Nov. 13 (see story page 1).

Sources who have seen XGA demonstrations said it has the following features:

- Options for 1,024- by 768-pixel and 1,280- by 1,024-pixel resolution. VGA resolution is 640 by 480 pixels.
- A 70-Hz screen refresh rate.

- 16-bit color, allowing as many as 32,000 colors to be displayed at once on-screen from a palette of 16 million colors.
- Upward compatibility with VGA.

Sources said that if XGA comes installed on the motherboard of the new PS/2, it will almost certainly become the new PC graphics standard.

Insiders reported that the most serious internal debate in IBM is whether to keep XGA on the motherboard of the Model 90 and 95.

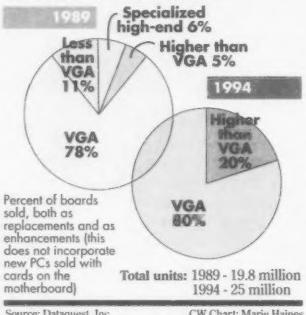
Those who have seen the product said it has always been demonstrated on a PS/2 motherboard. However, they conceded that IBM might also release XGA as, in essence, a replacement for the 8514/A, IBM's current high-level PC graphics card. The 8514/A, which IBM once positioned as a VGA successor, is languishing with 1% to 2% of new graphics card sales, compared with 78% for VGA and compatible cards, according to Dataquest, Inc. in San Jose, Calif.

If sold separately, XGA could become a must-have product for computer-aided design and manufacturing, high-end imaging and desktop publishing users, but it would probably be much more expensive. Few other users would be able to justify spending

the money needed for XGA, just as they have balked at spending more than \$2,000 for the combined 8514/A, VGA-compatible card and related monitor. A VGA card with a monitor costs as little as \$400.

If IBM releases XGA on the motherboard of its new high-end

What's in a picture
IBM Video Graphics Array boards dominate the market for desktop display cards



Percent of boards sold, both as replacements and as upgrades. This does not incorporate new PCs sold with cards on the motherboard.

Source: Dataquest, Inc.

machines, "what that means for all of us in the industry is a new video display standard," said Henry Quan, director of marketing for Scarborough, Ont.-based ATI Technologies, Inc.

However, the standard would take some time to seep down from the high end to general machines and also to drop in price, in much the same way as VGA did when it was introduced in 1987, sources said.

"Assuming XGA was VGA-

compatible and it was shipping today, it's at least a two- to three-year process for a new graphics standard to replace the old one as a standard," said Robert Harshman, president of Zeek Corp., a PC graphics firm in Chicago.

XGA is also expected to spearhead IBM's push into multimedia, and this is what is driving the increase in performance.

With 16-bit color, screen displays will offer what is called "perfect video." Perfect video means that the human eye cannot tell the difference between it and true 24-bit color, such as can be seen in a photograph.

By releasing the product at 16 bits, IBM will gain much better hardware performance levels than it would with a 24-bit specification.

"Twenty-four bits of color only slows down performance and adds an extra megabyte of RAM to the cost of the computer, and how many color printers are in the market?" asked Edward Schaefer, vice-president of marketing at Genoa Systems, a major VGA board maker.

Some observers doubted XGA will do much to remove VGA from its position as the graphics standard until prices fall.

"Will it impact VGA substantially? My gut feeling is no, because it's higher end and high cost," said Jim Anderson, director of graphics marketing at Headland Technology, Inc. and chairman of the Video Electronics Standards Association. "If [IBM's] pulled off a higher-resolution card at low cost, then it will be great, and we'll all do it."

COMPUTERWORLD

Editor in Chief	Bill Labers
Executive Editor	Paul Gillin
News Editor	Peter Bartolin
Assistant News Editor	James Connolly
Senior Editors	Clinton Wilder, Management Elizabeth Howlett, Networking Patricia Keefe, PCs & Workstations Michael Alexander, Advanced Technology Rosemary Hamilton, Systems & Software Neil Margolis, Industry Maryfran Johnson, Systems & Software
Senior Writers	Janice M. Wexler Richard Pastore
Staff Writers	Sally Cusack
New Products Writer	Gary Byrne
Research Coordinator	Kevin Burden
Features Editors	Glenn Rifkin Joanne Kelleher
Senior Editors	Michael L. Sullivan-Trainer Joseph Maglitta, In Depth/Integration Strategies Mary Grover Brandel, Product Spotlight
Managing Editor, Special Projects	Lory Zottola
Senior Writer	Alan J. Ryan
Associate Editors	Laura O'Connell Cathleen A. Duffy
Researchers	Jodie Naze Kim Nash Lorraine
Design Copy Editor	Derek Slater
Assistant Chief Copy Editor	Donald St. John
Features Copy Editors	Joyce Chutchan
Copy Editors	Carol Hildebrand Catherine Gagnon
Design Director	Christopher Lindquist Kimberlee A. Smith Alice Lesch Kelly Kelly E. Dwyer
Graphics Designer	Nancy Kowal
Graphics Specialist	Tom Monahan
Design Assistant	Paul Mock
Assistant to the Editor in Chief	Marie Haines
Editorial Assistants	Linda Gorgone
News Bureaus	Lorraine Witzell Tammy Grynewicz Stefanie McCann
Rights and Permissions Manager	Sharon Bryant
Book Issues	Margaret McIndoe
West Coast	708/827-4433
Midwest	Ellis Bookier, Bureau Chief
East Coast	Michael Fitzgerald, Correspondent
News Service	IDG News Service Penny Winn, Director
Editorial Office	Box 9171, 375 Cochituate Road Framingham, MA 01701-9171 508/879-0700
Subscriptions	Fax: 508/875-8931
MCI Mail:	COMPUTERWORLD Subscriptions: 800/669-1002

AFIPS votes itself out of existence after 20-year run

BY PATRICIA KEEFE
CW STAFF

RESTON, Va. — The members of the American Federation of Information Processing Societies (AFIPS) voted unanimously last week to dissolve the 20-year-old organization, effective Dec. 31.

Assets of \$1.4 million will be divvied up among the 17 societies that make up AFIPS, based on a formula laid out in the bylaws. Through these societies, AFIPS claims a constituency of about 240,000.

There may be an effort among some society members to form a new society, said Dennis Bybee, who represents the International Society of Technology in Education (ISTE) within AFIPS.

The dissolution issue was first broached by ISTE last April [CW, April 10], which almost immediately found its membership under question.

ISTE comprises two former societies, and there was a question as to whether the combined entity needed to reapply to join, even though AFIPS had already accepted its membership fees. Last week, the AFIPS board reinstated the group, Bybee said.

In April, both the Institute of Electrical and Electronics Engineers, Inc. and the Association of Computing Machinery (ACM) countered the ISTE bid to dissolve AFIPS with a plan to buy out any disinterested parties and to remodel AFIPS into a government lobbying force.

Last week, the resolution to dissolve AFIPS originated from the six directors representing ACM and the IEEE Computing Society (IEEE/CS), according to T. Michael Elliott, executive director of the IEEE/CS.

"I think it's true" that AFIPS has outlived its usefulness, said Elliott, who is serving on the committee charged with dissolving AFIPS.

Japan

FROM PAGE 1

The U.S. dollar equivalent of the Japanese pricing ranges from \$13,400 to \$17,420, depending on model and storage options. The desktop model began shipping last week, and the 33-MHz box is slated to ship next month.

Though the Japanese machine pricing is probably not indicative of U.S. pricing, the hardware specifications are another matter, analysts said. "These gross specs are probably going to be identical right down the line," said Tom Comerford, an analyst at Datapro Research Corp. in Delran, N.J.

Observers originally thought IBM would deliver two I486-based machines dubbed the Models 90 and 95 by early this month. Industry analysts have speculated that complications in Federal Communications Commission certification or availability of a 33-MHz version of the I486 chip have pushed the expected release date back to at least the last week of this month.

IBM spokesman Matt Jeffrey would not comment on unan-

nounced U.S. products but said the Japanese PS/55 personal computer line parallels the U.S. PS/2 line "quite closely." The two lines are growing more similar in architecture at the high end, he added.

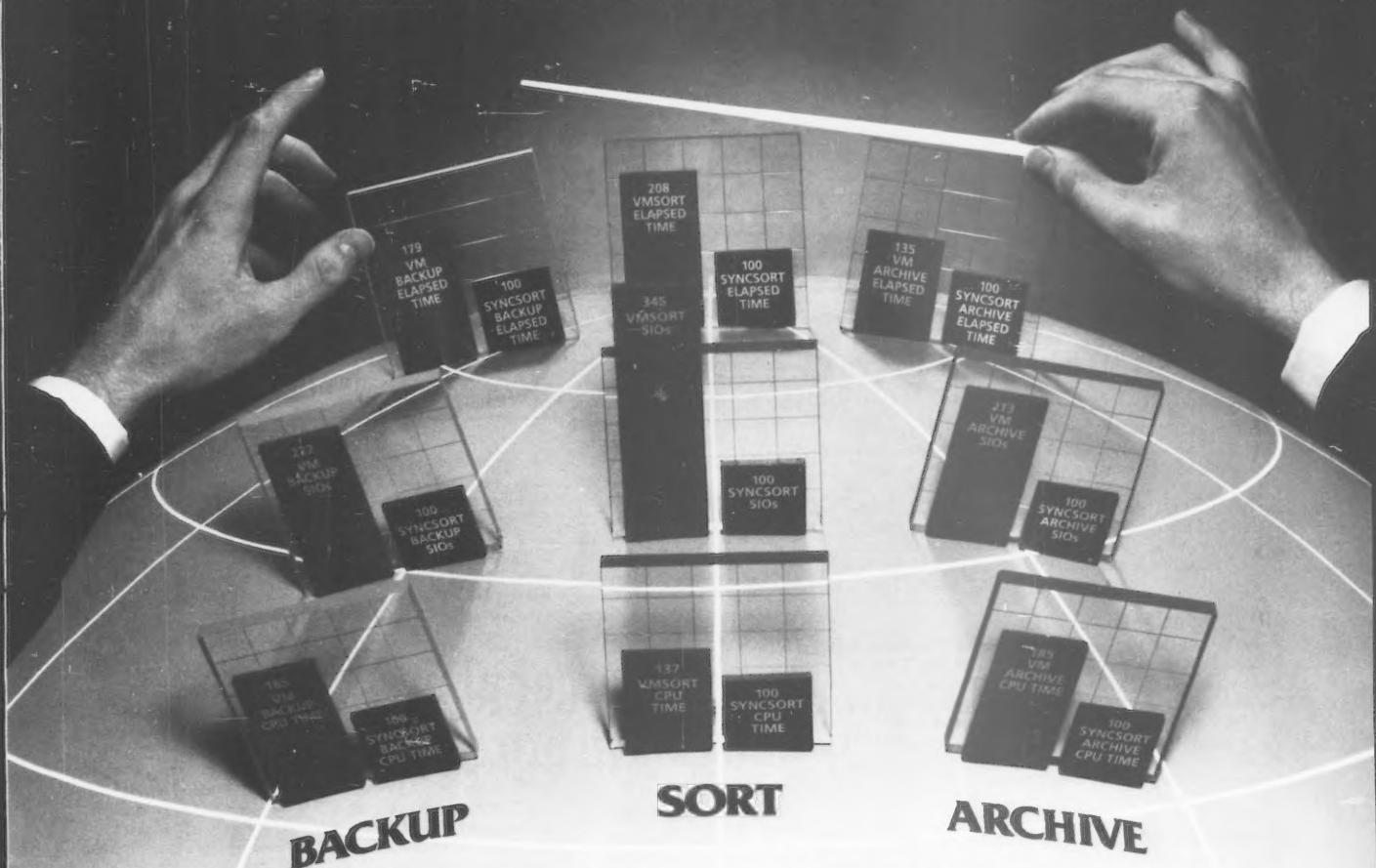
The fact that Japan led with a server announcement indicates the growing importance of that market as well as the increased autonomy afforded to IBM divisions, said Sam Albert, an IBM analyst and president of Sam Albert Associates in Scarsdale, N.Y.

Though IBM divisions have been increasingly encouraged to take aggressive initiatives, Albert said the Japanese would not have made the announcement without corporate consent.

"The initiative of the Japanese office has increased," Mii told *Computerworld Japan*. He added that some IBM PC products will be announced first in Japan in the future.

Mii also noted IBM's OS/2 Version 1.3 would accompany the PS/2 introductions in the U.S. He also speculated on an upcoming laptop, which he said will be based on Intel's 32-bit 80386 or I486 processor.

DAY IN AND DAY OUT, SYNCSORT PERFORMS BRILLIANTLY FOR VM AUDIENCES.



VM audiences count on Syncsort for the best performing VM sorting, backup, and archive products. Products that save system resources — CPU time, I/Os, elapsed time, disk space — day in and day out.

Syncsort/BACKUP (SYBACK) performs the fastest logical and physical backups, giving you complete file, minidisk, volume and system-level protection. And for disaster recovery, no product can restore a system faster.

SyncSort CMS is simply the fastest, most efficient sort, merge and copy product in the VM world.

Syncsort/ARCHIVE stores, tracks and retrieves little-used files. User-oriented and exceptionally easy to use, Syncsort/ARCHIVE makes archiving routine, freeing up valuable disk space.

And that's not all. Over the next few months, VM audiences will be introduced to Syncsort's new high performance productivity tools. Unlike other software companies, our commitment to VM is strong — and growing stronger.

If you're looking for today's best performing VM products, look to the company that leaves audiences cheering: Syncsort.

syncsort
INC.
50 Tice Boulevard, Woodcliff Lake, NJ 07675
800-535-3355

NEWS SHORTS

Ingres adds gateways

On the eve of its planned merger with Ask Computer Systems, Inc. (see story this page), Ingres Corp. announced gateways between its relational database management system and two of IBM's relational databases, DB2 and SQL/DS. At the same time, Ingres updated its gateways to Digital Equipment Corp.'s RDB relational database. The gateways are intended to boost the use of Ingres in enterprise-wide networks and mixed-vendor environments. Ingres gateways to nonrelational database systems — IBM's IMS and DEC's RMS — were also enhanced. Pricing for the DB2, IMS and SQL/DS gateways ranges from \$50,000 to \$400,000, depending on the size of the machine supported. Prices for the gateways to RDB and RMS range from \$2,500 to \$150,000.

Silicon Graphics boosts low end

While Silicon Graphics, Inc. waits on the next generation of reduced instruction set computing processors from its supplier, Mips Computer Systems, Inc., it is taking steps to improve its low-end graphics workstations. The company announced an upgrade last week that takes a 16 million instruction per second (MIPS) or 10 MIPS processor-based Personal Iris workstation and, by increasing memory throughput, system bus bandwidth and clock speed, hits a performance level of 33 MIPS or 23 Specmarks for \$9,000, Silicon Graphics claimed. In other news, Silicon Graphics reported that net income for its first fiscal quarter was up 84% compared with the comparable period last year, rising from \$5.2 million to \$9.6 million. Revenue grew from \$86.4 million to \$115.8 million.

Modest growth at AT&T

AT&T announced modest revenue and profit growth of 5% and 1.9%, respectively, last week for the third quarter. Net income would have been higher than the \$712 million posted but for the heavy launching costs associated with AT&T's new Universal Card credit- and calling-card combination. Product sales, which include computer systems and network products, rose 12.7% to \$3.08 billion largely on the strength of international markets, and revenue totaled \$9.66 billion.

HP tiptoes into X.500

Trying to jump the gun on network directory X.500 standards, Hewlett-Packard Co. last week said it is shipping its X.500 addressing product. The company acknowledged that it was only shipping "core functionality" of the product to a selected group of fewer than 20 customers. The X.500 product acts like a distributed database with information on local network addresses so that local users can find addresses in other areas without having to go through a large central directory.

Stephens named CEO at Emulex

Storage and networking products vendor Emulex Corp. tapped former Western Digital Corp. and IBM executive Robert Stephens as president and chief executive officer. A 20-year veteran of the industry, Stephens last served as senior vice-president and general manager of the microcomputer products group at Western Digital. At Emulex, Stephens replaced interim chief David Hanna, who will continue on the board of directors.

OSF/1 to become a reality

The Open Software Foundation (OSF) said it will start taking orders tomorrow for the long-awaited OSF/1, its version of the Unix operating system intended to challenge AT&T's Unix System V as the industry standard. The expected rollout comes about 30 months after an 18-month delivery time frame cited by OSF when intentions to develop the operating system were announced in May 1988. Because OSF/1 is based on AT&T's Unix System V, OSF said it will take four to six weeks for customers to receive the source code because OSF must verify that they also have a license for Version 2.0 or higher of AT&T's Unix System V.

More news shorts on page 115

D&B's medium is the migration

BY MARYFRAN JOHNSON
AND MAURA J. HARRINGTON
CW STAFF

FRAMINGHAM, Mass. — Dun & Bradstreet Software began broadcasting a migration message last week to reassure its 11,000 users as they move toward a "future architecture" encompassing the applications inherited in the tumultuous merger of Management Science America, Inc. and McCormack & Dodge Corp.

"We are ready to flex our muscle a little bit," said James Henderson, executive vice-president of marketing and technology for the \$500 million software vendor.

Henderson said both product lines will be continuously and equally enhanced as D&B Software merges the lines onto a "next generation" suite of products in the mid-1990s.

"We will have a single product line in the future, but it will be up to customers when they migrate," he said. D&B Software plans to sprinkle financial sweeteners along that migration path by offering upgrades and conversion tools at no extra charge beyond a rise in maintenance fees.

Say the word

"It's still a lot of words at this point, but they're saying the right words," said Scott Davey, assistant controller of systems and planning for the accounting department at Fairchild Fasten-

er Group, an aerospace company based in Carson, Calif. "They're trying to keep us all happy," he said.

Other users contacted last week also seemed pleased with the company's intentions.

"I think they've gone to great

Biggest little piece of pie

Although it holds less than a quarter of the market, D&B Software (once MSA and M&D) is a major player in application software

Percent of 1989 worldwide software revenues for U.S. independent vendors

Accounting software (Total: \$1 billion)	
MSA/McCormack & Dodge	23.3%
Computer Associates	10.8%
Oracle	9.6%
Ross Systems	7.5%
Other	62%

Human resource management (Total: \$395 million)	
MSA/McCormack & Dodge	16.2%
Integral Systems	8.4%
Cyborg	3.8%
Genesys	3%
Others	68.6%

Manufacturing (Total: \$357 million)	
Ask Computer Systems	9.6%
Pansophic	4.2%
American Software	3.6%
Computer Associates	3.5%
MSA	3.5%
Other	75.5%

Source: International Data Corp. CW Chart: Doreen St. John

lengths to keep their users secure," said Brian Cameron, administrative specialist at Stone & Webster, an engineering construction firm in Boston.

The MSA and M&D applications — renamed the "E Series" and "M Series," respectively — have had some 20 product en-

hancements throughout the product line since the merger.

"D&B has a good reputation for treating acquired companies carefully and kindly," said Bernard Goldstein, a partner at Broadview Associates, a research firm in Fort Lee, N.J.

After six months of market research and extensive customer interviews, D&B Software officials came up with a two-pronged strategy.

In 1991, customers can expect major hits, or enhancements on all the financials, materials management packages, human resources, tools, manufacturing and higher education software, Henderson said.

The company will begin introducing what it calls "value-added products" — a kind of bridge to the unified product line — in relational database, workstation and midrange applications.

One example is a full line of products coming for the IBM Application System/400, which has only one D&B manufacturing application now.

By 1994, users should see a "re-architected" product line — built with computer-aided software engineering (CASE) tools — that will merge the two camps.

Ingres merger plan puts Ask in proxy fight

BY JEAN S. BOZMAN
CW STAFF

MOUNTAIN VIEW, Calif. — The merger of Ingres Corp. and Ask Computer Systems, Inc. turned into a race to the finish line last week as Ask attempted to jump all the legal and financial hurdles before Ask's shareholders meeting this Friday. The latest hurdle was tossed up by Ask's second-largest shareholder, who launched a proxy fight to displace Ask's current management.

At week's end, James T. Lennane in Naples, Fla., who owns 9.7% of Ask shares, had mailed out thousands of proxy letters to Ask shareholders. Lennane, who in 1973 founded System Integrators, Inc., a Sacramento, Calif., electronic publishing firm, now manages multiple investments, including a desktop publishing software firm.

The proxy statement said

that Lennane seeks election to the five-person Ask board of directors, along with two of his associates. Lennane's filing said his group "is diametrically opposed to the purchase of Ingres Corp., which it believes will dramatically weaken the financial position of Ask." The proxy fight could go on even after the merger is completed, Lennane's New York attorneys said last week.

An open letter by Ask Chief Executive Officer Sandra Kurtzig, written in response to Lennane's proxy letter, said, in part: "Your board of directors firmly believes that the proposed acquisition of Ingres . . . is in the best interests of stockholders and will enhance long-term stockholder values by positioning Ask to grow in the 1990s."

Last Thursday, Lennane's lawyers requested that a Delaware chancery court reconsider an earlier decision rejecting Lennane's request to bar Ask's sale

of \$60 million worth of stock to Electronic Data Systems Corp. and Hewlett-Packard Co. That stock sale, part of the complex arrangement to buy Ingres, would unfairly dilute the value of current shares, Lennane said. However, Lennane's latest motion was rejected on Friday.

Barring any legal injunctions, Ask was prepared to buy Ingres by Friday at midnight — the deadline for Ingres stockholders to tender their shares. "The only reason this deal wouldn't go through is if we didn't have enough shares tendered," an Ask spokeswoman said.

Ask planned an immediate layoff as soon as the merger becomes official but would not say how many Ingres workers would be terminated.

At week's end, EDS and HP were on standby. "Our commitment to Ask's partner has not changed," an EDS spokesman said. "But this is really their fight. We're concerned about it, but it's up to Ask to deal with it." An HP spokeswoman said, "We have not signed a check yet, but we still have every intention of going through with our investment plans."

Paperback pulls spreadsheet, won't appeal Lotus victory

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — An unrepentant but beaten Paperback Software International agreed last week to stop marketing its VP Planner product line by Dec. 1 and pay Lotus Development Corp. \$500,000 for violating its 1-2-3 spreadsheet copyrights.

Paperback also agreed not to appeal a June federal court ruling that it had infringed on Lotus copyrights for the user interface portion of 1-2-3.

The initial outlook for VP Planner users is not good. Lotus said it has no plans either to support them or offer discounts as an incentive to move to 1-2-3.

A Paperback spokesman, Mike Burdick, said it will not "abandon" its VP Planner customers, which number at least 240,000, according to Dataquest, Inc. However, "We are not sure how we'll be able to support them. We have to look at what our options are," Burdick said, adding that it is possible that Paperback could come up with a noninfringing spreadsheet product.

Burdick termed the loss of the three-product VP Planner family, which contributed 68% of the company's revenue, "a significant blow." Two insurers are paying the damages to Lotus.

Although former chairman Adam Osborne has contended that win, lose or draw, the suit would destroy Paperback, Burdick was more upbeat: "We have mostly debt on our balance sheet, but we have enough stability to continue developing products, keep creditors satisfied

and market [four remaining] products. We have a chance to [be] a viable entity."

After four years of legal wrangling, the software publisher wants to pick up the pieces and move on. Paperback's primary focus will shift to VP Expert, an expert system development tool. Company President Stephen Cook said a further fight "is best carried on by participants with greater resources."

A similar case, involving another company with limited resources — Brighton,

Mass.-based Mosaic Software, Inc. — goes to trial this week. Mosaic has agreed to be bound by Judge Robert Keeton's rulings in the Paperback case concerning the scope of Lotus' copyrights and has also agreed that its Twin spreadsheet package copied 1-2-3.

Keeton faces at least two more Lotus copyright suits, which were filed in June against two better heeled rivals, Borland International and The Santa Cruz Operation. Borland's bid to have its suit tried in California failed; a trial date in Boston is expected to be set shortly.

Paperback's decision not to appeal spares Lotus the risk of having a federal appeals court reverse Keeton's ruling that 1-2-3's interface is copyrightable. "It gives Borland one less straw to cling to,"

Lotus attorney Hank Gutman said.

"The fact that a small company does not have the money to defend themselves any further does not change the merits of our case," said Borland spokesman Dick O'Donnell.

He claimed that in a case involving Ashton-Tate Corp.'s Full Impact software, the U.S. Court of Appeals for the 9th Circuit recently upheld an earlier ruling that the spreadsheet's menu structure is not copyrightable.

According to an Ashton-Tate spokesman, Borland has it all wrong. The California court only ruled that the spreadsheet metaphor, specifically the cells and "inverted L," were not copyrightable, he said: "The interface wasn't an issue in our case."



3-2-1

After a slumping second quarter, Lotus Development Corp. took it on the chin, as expected, in its third quarter ended Sept. 30. While revenue grew slightly, about 2%, over the same period a year ago, net income plummeted 63%.

Wall Street and Lotus said they expect sales to rebound significantly in the fourth quarter, in part because of the release of 1-2-3 Version 3.1, which corrects some of the shortcomings in predecessor 1-2-3 Version 3.0.

Net sales for the third quarter totaled \$157.4 million vs. sales of \$153.9 million in 1989's corresponding quarter. Net income was \$8.6 million, down from \$23 million a year earlier.

In an effort to bolster its sagging stock, which has dropped as low as 12½ points from a 52-week high of 39½, Lotus announced plans last week to buy back up to 12%, or 5 million shares, of its 43 million shares outstanding.

The news was slightly more upbeat at Ashton-Tate Corp., which reported a net income of \$1.1 million on net revenue of \$60.4 million in its third quarter ended Sept. 30.

COMPACTOR® Improves Your Space Utilization and DASD Performance

Dataset and Free Space Consolidation — CPK merges multi-extent datasets into one extent and consolidates all of the free space into one or two free space areas.

Dataset Placement — Position datasets as part of a group or in sequence.
Reporting — Track maps and extensive VTOC analysis.

RELEASE PERFORMANCE COMPARISON

FDR® 5.0E Versus DFDSS V2.5

Release overallocated space on 1,000 datasets on a 3380-K on a 4381-91E running MVS/ESA®

ELAPSED TIME (SEC.)		
DFDSS	342 sec.	
CPK	96 sec.	

CPK took 72% less elapsed time

CPU TIME (SEC.)		
DFDSS	37 sec.	
CPK	14 sec.	

CPK took 62% less CPU time

Free 90-day trial.
Send or call for a
CPK versus DFDSS
DEFRAG Comparison.

INNOVATION®
DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

EUROPEAN OFFICES:

GERMANY
089-439-2053

FRANCE
01-47-69-15-15

NETHERLANDS
03240-41660

UNITED KINGDOM
081-905-1266

Unix box poised for small firms

Application DEC 433MP seen as well-positioned market opportunity

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — A Unix-based multiprocessor packed with Intel Corp. chips sashayed forth from Digital Equipment Corp. last week, with company officials eyeing a \$40 billion opportunity in computer sales to small to medium-size businesses.

The Application DEC 433MP is billed as the company's most expandable system, scalable from one to six Intel 486 processors and based on The Santa Cruz Operation's SCO Unix System V. It was designed to be sold through value-added resellers (VAR) and will be available in February at prices ranging from \$17,500 to \$80,000.

DEC officials said the machine poses no threat to its popular Microvax line, but industry analysts suggested that the system may hold more appeal for Fortune 500 Microvax customers than DEC realizes. "This may eat some low-end VAXes," said Wes Melting, an analyst at Gartner Group, Inc. in Stamford, Conn. "But we think DEC will pick up \$1 billion in net revenue that doesn't even touch their existing business in this market."

Companies looking for a Unix-based office automation server or preparing to make the transition from MS-DOS to Unix should find the 433MP particularly attractive as a low-priced server for networked personal

computers, Melting said.

Yet the present lack of DEC support on the 433MP makes it an unlikely candidate to replace Microvaxes in some corporate networks.

Bechtel Corp., for example, has dozens of Microvaxes in its corporatewide DEC environment, said A. B. Cleveland, manager of automation technology at Bechtel's Gaithersburg, Md., regional office. "The more critical issue for us would be how well a machine supports Decnet," he said. "We are a global corporation with wide-area networks integrated tightly with LANs, and Decnet provides that for us."

Pick from three

With the introduction of the 433MP, DEC is now offering its customers three versions of Unix — its own Ultix operating system for technical computing, AT&T Unix System V for telecommunications and SCO Unix for small businesses.

"DEC sees this as a machine to sell to people who've never bought a medium-size computer before," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "The tricky thing is they've been saying that Unix is not commercial, and here they are bringing out a commercial system for the Unix market. Will the real DEC please stand up?"

John Sitar, president of Corstar Business Computer Co., Inc.

in Hawthorne, N.Y., views the 433MP as "the beginning of a commitment to a whole new direction in computing by DEC."

As one of DEC's largest VARs for the past two decades, Corstar is a beta-test site for the new Intel-based machine and is now porting 1 million lines of code from VMS to SCO Unix.

The most significant point for users is being able to have low-cost asynchronous terminals accessing a central platform without networking, Sitar said.

DEC also beefed up its support and customer services for resellers, offering to subcontract DEC maintenance, recovery and desktop services for the smaller VARs as well as the larger ones.

The 433MP supports up to 128 users when fully configured with six processors and can operate simultaneously as a multi-user machine, a PC LAN server and an X Window System server. It will run thousands of applications based on the SCO Unix, MS-DOS, Pick and Mumps operating systems.

The system has a dual bus architecture that allows customers to attach additional peripherals — up to seven PC option boards — without slowing system performance, Eichhorn said.

Gartner Group figures the machine will compete handily against Compaq Computer Corp.'s SystemPro, IBM's RISC System/6000 and NCR Corp.'s 3345.

VAX

FROM PAGE 1

The VAX 9000 order backlog is reportedly as high as 400 systems already, and the company reportedly plans to ship at least 100 mainframes every quarter. One year ago, however, DEC officials were hoping to have approximately 300 to 400 mainframes out in customer sites by the end of 1990.

"We're still managing the ramp-up to full production," said Bob Glorioso, vice-president of DEC's information systems business unit. "We are paying attention to what the customers tell us, and they're teaching us."

What George Kerns had to teach them, for example, convinced DEC to station three of its full-time employees at Atlanta-based Contel Cellular, Inc. Kerns, who is vice-president of information services at the cellular phone company, rejected the notion of calling the DEC hot line in Colorado Springs to muddle through a system software diagnosis.

"We're all doing some pioneering with their technology,

and the way they support their transaction processing customers had to change," Kerns said.

Contel's major application is a "customer care system" that does everything from logging in orders from remote offices to tracking changes in the customer database. Because it was built on DEC's RDB database and several layered system software products, Kerns needed in-house

to be partitioned or to run class scheduling has kept the bank at arm's length from the new mainframe.

"DEC is always successful with its hardware. The shortcomings are on the software side," said Peter Coriasco, vice-president for technological strategic planning at Bankers Trust. Partitioning would allow users to run multiple versions of the operating system, and class scheduling provides a way to "properly assign computing resources to individual applications," he explained.

Taking it seriously

"I see the lack of these two as a major problem for users wanting to run multiple applications," Coriasco said. "But I know DEC is working hard on this, and I believe they will be successful. All the way from Ken Olsen down, they are taking software issues very seriously."

An unexpected use for the mainframe VAX turned up in Albany, Ind., at Paws, Inc., an art studio company founded by cartoonist Jim Davis, creator of Garfield the cat.

MIS director Tim Bird had a

DEC IS always successful with its hardware. The shortcomings are on the software side."

PETER CORIASCO
BANKERS TRUST

experts to keep his system up and running.

While VMS may share the same letters as MVS — IBM's mainframe operating system — the DEC system software is still not quite its equal, according to some users. At Bankers Trust Co. in New York, VMS' inability

DEC rebounds mildly in first-quarter profit

BY RICHARD PASTORE
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. followed up its first-ever money-losing quarter with a timid step on the road to recovery, analysts said last week. The second largest computer maker announced a small profit of \$26 million on sales of \$3.1 billion for the first quarter.

The news was a mild surprise for the more pessimistic DEC watchers, who predicted another loss or a break-even showing. "Things are not as bad as people

sluggish, the dip is due to DEC's product transition, according to Shao Wang, an analyst at Smith Barney, Harris Upham & Co. in New York.

However, observers noted that a number of products are doing well for DEC, including its Unix-based workstations and the mainframe-class VAX 9000, which, for the first time, contributed to the bottom line. Seventy-five VAX 9000 shipments added about \$100 million to the revenue coffers, Wu said.

DEC's service income grew a total of 8% this quarter, reach-

Basic math

Despite making cutbacks, DEC has watched climbing expenses and slowing sales combine to pinch profits

		Q1 1990	Q1 1991
Revenue			
Product sales	\$1.998	\$1.868	
Service and other	\$1.148	\$1.238	
	\$3.13B	\$3.09B	
Expenses			
Cost of sales	\$1.618	\$1.668	
Research and engineering	\$404.1M	\$401.9M	
Selling, general and administration	\$938.9M	\$1.02B	
	\$2.95B	\$3.08B	

Source: Digital Equipment Corp.

CW Chart: Paul Mock

fear; things have at least bottomed out temporarily," said David Wu, an analyst at S. G. Warburg & Co. in New York.

DEC lost \$256.7 million in the previous quarter ended June 30, the company's first taste of red ink. The dive prompted a plan to cut more than 5,000 employees from the payroll in this fiscal year.

Though the latest quarter's numbers seem to show DEC on the rebound, "it's a long road back," Wu said. "This is a company that's not healthy."

The main problem is that sales are down, observers noted. Product sales are off more than 6% from the like quarter last year. Though the economy is

growing \$1.23 billion. The portion of that income derived from systems integration services is growing by 20%, according to Wu.

Though it is difficult to extrapolate from one positive quarter, analysts predicted that DEC will continue its long, slow recovery next quarter with higher revenue.

But analysts warned that DEC's fourth-quarter numbers will probably not compare favorably with last year's like quarter, which was fairly strong. This quarter's earnings suffered in comparison to the previous year as well — revenue was down about 1% while profit fell by nearly 83%.

VAX 9000 Model 210 installed in August to provide Paws with a giant file server, a general purpose accounting and database machine and a production design system. The DEC service team particularly impressed Bird one night by flying in four KDM-70 disk controllers to replace defective ones that arrived with the machine.

"An hour after the first private jet brought us those KDM boards from Chicago, DEC sent another set of spares in case they didn't work," Bird recalled.

One user who falls into the classic technical mold for use of the mainframe VAX is Chrysler

Motors Corp. in Detroit, where the advanced manufacturing technical center has just installed one VAX 9000 Model 210 and has another on its way at Christmastime.

According to Joe Bulat, manager of computer-integrated manufacturing, the mainframe has quadrupled the power of his present Vaxcluster and provided some 1,200 users with the necessary support for product engineering. One key new application made possible with the VAX 9000 is handling the high-speed flow of real-time information between 10 assembly plants and three stamping plants.

The Problem With Buying Software From A Hardware Company

Once a company gets locked into hardware and software from one computer vendor, it operates at the mercy of that vendor.

Many companies buy and build software that runs on only one kind of computer. Locking themselves into one vendor's hardware. These companies can then find themselves trapped

into buying a ten million dollar computer when a one million dollar computer from another vendor would actually do a better job.

These expensive hardware traps can easily be avoided by using the right software.

Oracle software runs on virtually every computer—mainframes, mini-computers, workstations and PCs. From virtually every vendor.

Oracle software lets companies develop applications that run on all their computers. And share data among them as well.

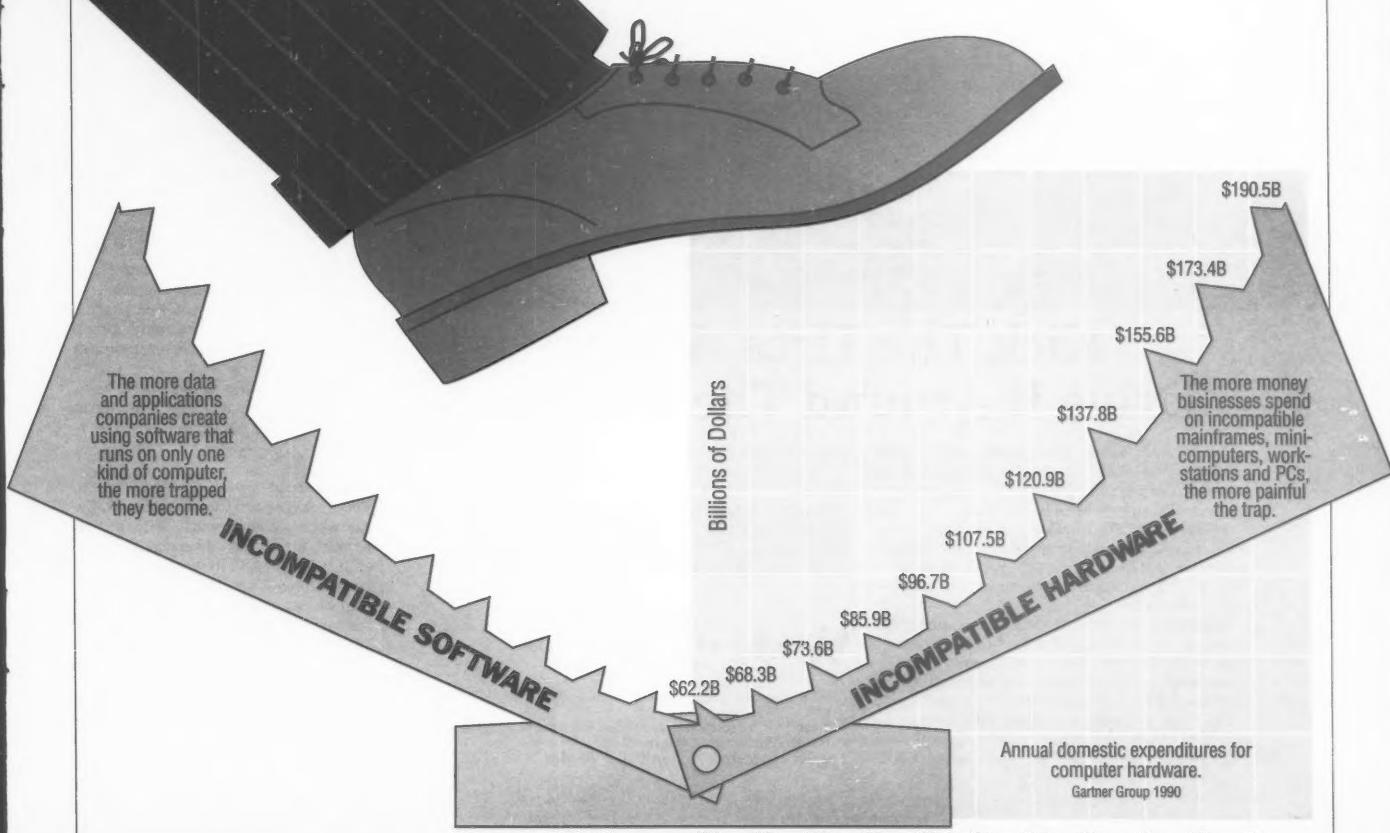
Most important of all, it lets companies exploit newer, faster and cheaper technologies as they emerge.

Call 1-800-633-1071 Ext. 8112 for more information.

We'll tell you how you can move forward without worrying about what you're stepping into.

ORACLE

Software that runs on all your computers.



DG goes with leaner, meaner MV product line

BY SALLY CUSACK
CW STAFF

WESTBORO, Mass. — Data General Corp. has reconfigured its bread-and-butter line of proprietary midrange systems with the announcement of the MV/30000.

"The MV line provides us with over a billion dollars in product and service revenues," said Dave Ellenberger, recently appointed division vice-president at DG's Eclipse marketing unit. "This is the fourth new MV platform we have announced this year."

The MV/30000, scheduled to take its

official bow at the annual DG user group meeting in Seattle this week, replaces the vendor's MV/15000 and MV/20000 systems. It is targeted at midrange customers doing office automation and business applications.

Cleaner product

According to Carolyn Griffin, an analyst at International Data Corp., a market research firm based in Framingham, Mass., the positioning creates a "cleaner and more streamlined MV product line." Griffin also said she feels that DG's newly consolidated MV product development and marketing divisions will make MV opera-

tions more efficient, from both a customer and a vendor standpoint.

The MV/30000, which runs the AOS/VS II operating system, is available in single- through quad-processor configurations and can be expanded with up to three I/O channels. The processor is based on a single-chip, custom CMOS microprocessor designed by DG and manufactured by Hitachi Data Systems Corp. in Japan.

Single-chip technology, which creates a single-board computer, offers the customer savings in terms of cost and reliability, Ellenberger said. He added that CMOS architecture allows customers to

take advantage of developmental advances in the semiconductor world.

One DG MV/15000 user, who wished to remain anonymous, commented that he had little interest in new MV system announcements and was more eager to take advantage of a "definitive" open systems migration plan coming out of the company.

The MV/30000 reportedly supports as many as 2,472 direct asynchronous connections and offers up to 256M bytes of error checking and correcting memory, which is available in 16M-, 32M- and 64M-byte increments. Other features include a diagnostic processor and a rack-mount chassis. Pricing for a single-processor, 16M-byte platform configuration is \$120,000.

Oracle CEO owns up to feet of clay

BY JEAN S. BOZMAN
CW STAFF

BURLINGAME, Calif. — Oracle Systems Corp. executives said they are not blaming anyone but themselves for Oracle's recent financial woes. At last week's shareholders' meeting here, Chief Executive Officer Larry Ellison took personal blame for the firm's recent \$36 million loss [CW, Oct. 1] and conceded that Oracle executives had been out of touch with middle managers.

"I wish I had seen it coming and changed our [high-growth] strategy earlier," Ellison told several hundred investors who gathered at Oracle's annual meeting Oct. 15. "If I had seen it six to nine months earlier, the first-quarter disaster need never have happened. But I didn't see it coming, and that responsibility is mine."

Senior management placed too much emphasis on expanding sales at yearly rates of 50% or more and had neglected to fix the bugs in existing software, Ellison said. "Development team managers recently told us, 'It's about time you guys in management finally figured out that we need to take time to fix the bugs,'" he said. "They also told us, 'It's about 18 months too late.'" Ellison said Oracle's new plans call for selling most Oracle products into the firm's existing customer base.

Ellison's remarks at the stockholders' meeting came minutes after a pro-forma renomination of the current board of directors.

Board scout

Ellison said he and Chairman Donald Lucas were spending much of their time scouting for new board members and other senior managers from multibillion-dollar high-tech firms. "We will take all the help we can get, from all quarters," Ellison said. "Nobody on the [current] board has run a multibillion-dollar corporation."

Industry analysts seemed relieved that top management was going on record for failing to forecast Oracle's 1990 sales slump in the face of a slowing world economy. "Oracle management needed to get rid of industry criticism that ... they weren't taking responsibility for what happened," said Charles Phillips, a senior analyst at Soundview Financial Group, Inc. in Stamford, Conn.

FREE
LOGIC GEM™
SOFTWARE OFFER!
See details below'



Kick The Tires And Drive It Around The Block.

Test drive the new PRO Developer™ CASE product from Holland Systems Corporation and see how much value can be packed into an analysis and design tool at an unbelievably low price!

Micro-based PRO Developer™ software comes with detailed methodology that enables professional systems and data analysts to move from analysis and design through development in a fully integrated manner.

Easy-to-use right from the box, or take advantage of the full range of education and training courses from Holland Systems Education Center.

Best of all, you don't have to take a financial risk to experience the advantages of PRO Developer™.

Call Chris McCarthy at 313/995-9595 for your no risk "Test Drive" or to request more information on PRO Developer™. Exciting professional CASE

products from Holland Systems Corporation also include PRO Planner™ for strategic planning and PRO Manager™ for project planning and control.

"As an Added Bonus, the first 300 'drivers' will receive absolutely Free a copy of Logic Gem™ - the decision logic table software from Sterling Castle."

Holland Systems
CORPORATION

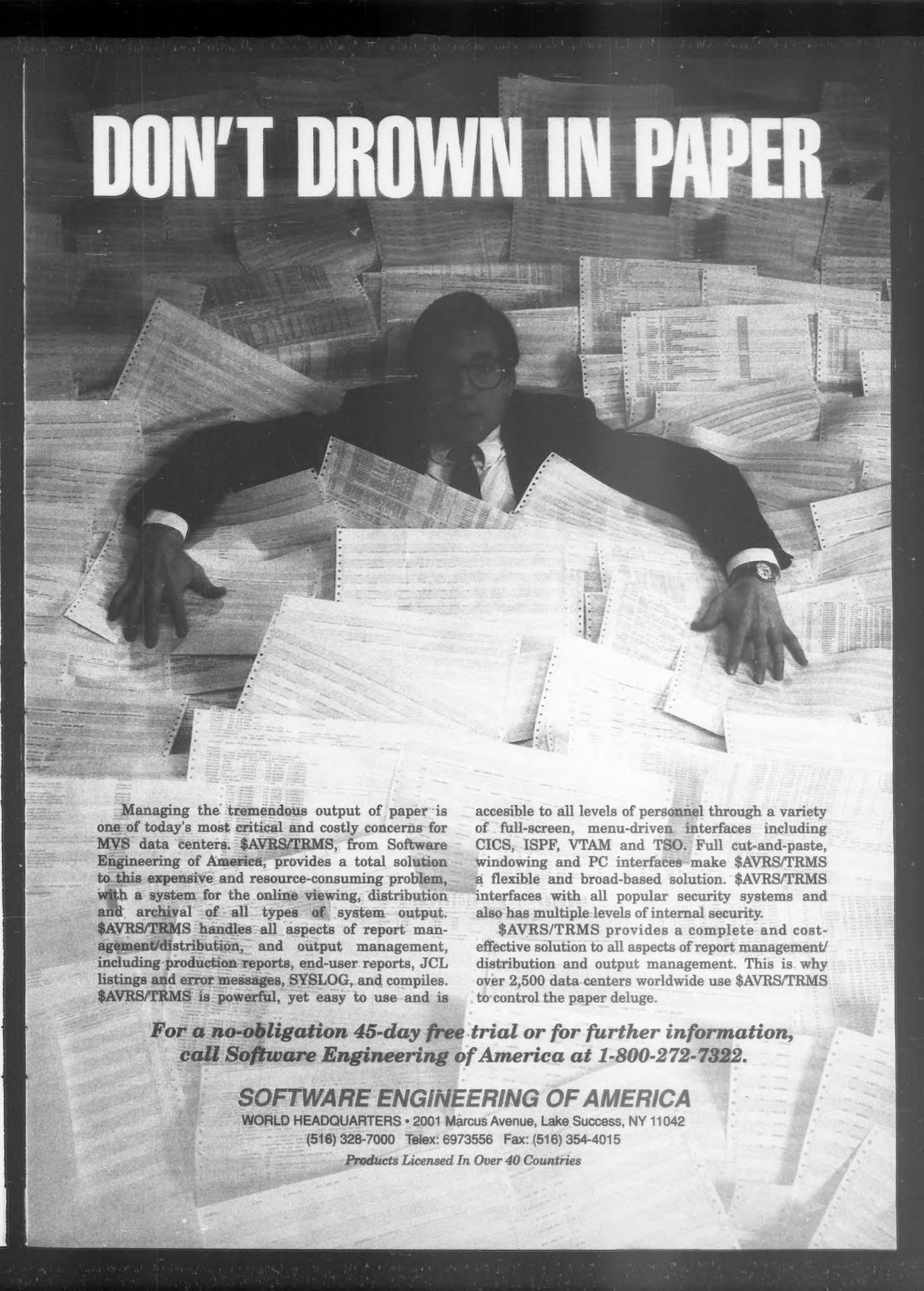
CASE products for systems professionals since 1981.

Holland Systems Corporation, 305 East Eisenhower Parkway, Ann Arbor, Michigan 48108.
Telephone 313/995-9595 FAX: 313/995-9163

PRO Planner™, PRO Developer™, and PRO Manager™ are trademarks of the Holland Systems Corporation. Logic Gem™ is a trademark of Sterling Castle Corporation.

© 1990 Holland Systems Corporation

DON'T DROWN IN PAPER



Managing the tremendous output of paper is one of today's most critical and costly concerns for MVS data centers. \$AVRS/TRMS, from Software Engineering of America, provides a total solution to this expensive and resource-consuming problem, with a system for the online viewing, distribution and archival of all types of system output. \$AVRS/TRMS handles all aspects of report management/distribution, and output management, including production reports, end-user reports, JCL listings and error messages, SYSLOG, and compiles. \$AVRS/TRMS is powerful, yet easy to use and is

accessible to all levels of personnel through a variety of full-screen, menu-driven interfaces including CICS, ISPF, VTAM and TSO. Full cut-and-paste, windowing and PC interfaces make \$AVRS/TRMS a flexible and broad-based solution. \$AVRS/TRMS interfaces with all popular security systems and also has multiple levels of internal security.

\$AVRS/TRMS provides a complete and cost-effective solution to all aspects of report management/distribution and output management. This is why over 2,500 data centers worldwide use \$AVRS/TRMS to control the paper deluge.

***For a no-obligation 45-day free trial or for further information,
call Software Engineering of America at 1-800-272-7322.***

SOFTWARE ENGINEERING OF AMERICA

WORLD HEADQUARTERS • 2001 Marcus Avenue, Lake Success, NY 11042

(516) 328-7000 Telex: 6973556 Fax: (516) 354-4015

Products Licensed In Over 40 Countries

AT&T to give Centrex users long-distance ISDN ability

BY ELLIS BOOKER
CW STAFF

BASKING RIDGE, N.J. — AT&T said last week that it will be able to offer ISDN Centrex customers connectivity over its long-distance network, crediting a software upgrade for the central office switches its Network Systems unit sells to local telephone companies.

While limited for now to Centrex services based on AT&T's 5ESS central of-

fice switch, analysts said the new service is significant in that it points the way toward flexible, nationwide Integrated Services Digital Network (ISDN).

"It extends the benefits of ISDN and allows, although with limitations, end-to-end service to Centrex customers," said Steve Sazegari, a senior industry analyst at Dataquest, Inc. in San Jose, Calif.

Up until now, Centrex-based ISDN arrangements have existed as islands, although they have been connected, for

demonstration purposes, over private-line networks.

The Primary Rate Interface Nodal/Centre Express (PRINCE) service will permit ISDN Centrex customers in two locations to establish a Basic Rate Interface ISDN call over AT&T's Primary Rate Interface (PRI), the ISDN service it launched in 1988.

PRINCE will only work for users whose Centrex ISDN service is provided through an AT&T 5ESS central office switch that has been loaded with the 5E6 generic software release that AT&T Network Systems began deploying at local telephone exchanges last year.

A limitation of the service, AT&T said, is that a PRI can only support a single customer connection. AT&T's PRI service

has a \$3,000 one-time installation fee as well as a \$400 per month fee.

Meanwhile, the second largest central office switch vendor, Northern Telecom, Inc., said last week that its local switch, the DMS-100, supports ISDN protocol connectivity with both the AT&T 4ESS and Northern Telecom's own DMS-250 toll switch. AT&T, which said Prince would be available at 250 local exchange central offices by year's end, had no comment on whether PRINCE would work with the Northern Telecom systems.

Apple financials hit slow track

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. felt the crunch from the slowdown in the personal computer industry last week when it announced financial results in which yearly sales figures had inched up slightly while quarterly earnings took a nosedive.

Net revenue for the fiscal year ended Sept. 30 totaled \$5.56 billion, a 5% increase over the \$5.28 billion reported for 1989. Net income for the full year was \$474.9 million, or \$3.77 per share, up 5% from profits of \$454 million, or \$3.53 per share, last year.

Revenue for the fourth quarter was \$1.35 billion, down 2% from the \$1.38 billion reported for the corresponding period in 1989. Profits for the quarter were \$98.5 million, or 81 cents per share, down 39% from \$161.1 million, or \$1.24 per share, reported last year. Earnings from one year ago also included \$48 million from the sale of Adobe Systems, Inc. common stock.

Chairman John Sculley partially attributed the mixed results to the readjustment of the Macintosh product line, in which anticipation of new low-end Macintoshes stifled sales throughout the line. "We expect that many customers who wanted our products but didn't purchase them because of their prices will now choose Macintosh," he said.

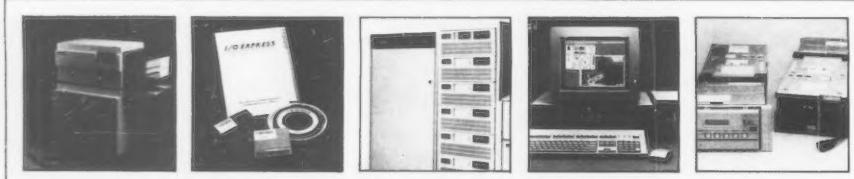
Last week, the firm introduced a trio of new Macintoshes — including one priced at less than \$1,000 — that reduced the entry price to Macintosh by as much as 50% and is expected to make Apple machines more competitive with similarly configured MS-DOS machines.

Analysts said they expect the additions will help Apple regroup. "Apple is poised to increase its share of the personal computer market over the next two years," said David Wu, an analyst at S.G. Warburg Securities in New York.

The company, however, still faces tough competition from Microsoft Corp., which in the spring introduced the Windows 3.0 graphical user interface package that closely approximates the point-and-click screen appearance of the Macintosh.

While the domestic market is softening, Apple officials said they will continue to look overseas to take up the slack. The international market, particularly Europe, continues to play an increasingly important role in the firm's financial portfolio. International sales accounted for 42% of net sales for the full year, compared with only 36% one year ago, company officials said.

Ideas. Information. Solutions.



That's what DEXPO West is all about. Meeting people. Sharing information. Finding solutions.

Like how to consolidate and manage your networked VAX systems. How best to distribute information across your multiple VAX sites. What applications to integrate. What terminal servers to select. What backup systems to use.

DEXPO West is the largest DEC computing and connectivity show in the world, with over 300 exhibitors and more than 15,000 products and services. Like spreadsheets and disk drives. Local area networks and monitors. Emulation and windows.

Connect with representatives from the most important computer companies in the market today. Let them share with you the options of multi-vendor integration, software compatibility and freedom of choice.

Call today to register toll free at 800-87-DEXPO. DECUS symposium attendees are always admitted FREE but require separate registration.

DEXPO
W E S T 90

The World's largest DEC Computing and Connectivity Exposition

December 11-13, 1990
Mirage Hotel, Las Vegas Convention Center, Las Vegas, Nevada

All Attendees Are Eligible To Win A Free Trip To Australia

VAX and DEC are registered trademarks of Digital Equipment Corporation
DEXPO West is owned and produced by Miller Freeman Expositions, 1050 Commonwealth Avenue, Boston, MA 02215-1135

Opening Database Servers To The Whole World

ORACLE Server. Nonstop data sharing among PCs, Macs, minis, and mainframes.

Imagine the frustration of being in an airplane that can only take off and land at the same airport. SQL Server suffers that same problem. It limits users to a single server running just OS/2 and Named Pipes.

ORACLE® Server is different. As an open server, it works with virtually any network, any operating system, application or database system.

So ORACLE can act as an information hub to share data across an organization's PCs, Macs, minis and mainframes.

ORACLE Server works with existing Novell, 3Com, and IBM LANs as well as Lotus 1-2-3 and dBASE applications.

It even allows access to corporate data stored in other vendors' software such as RMS on DEC minis and DB2 on IBM mainframes.

And only Oracle provides a set of integrated tools for portable application development, office automation and CASE. It also has interfaces to the most popular programming languages.

All this is backed by the largest service and support organization of any software company in the world.

Call 1-800-ORACLE1 ext. 8193

**Call
1-800-ORACLE1
ext. 8193
and sign up for the
Client/Server
Forum
in your area.**

Because no one wants to be all hooked up with no place to go.

to buy ORACLE Server for OS/2 for \$3699 and get six months of free upgrades and phone support.

Or you can try the 3-user Developers Version for \$1299.

ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

Wang introduces open standards software plan

BY SALLY CUSACK
CW STAFF

BOSTON — Wang Laboratories, Inc. moved last week to make good on its December 1989 promise of open standards by introducing a software connectivity plan that allows Wang VS minicomputers to work as servers on personal computer-oriented local-area networks.

Introduced at the U.S. Society of Wang Users' (USSWU) annual meeting in Boston, Open/Server also includes enhanced communications with other minicomputer and mainframe hosts.

The Open/Server architecture has

been divided into two groups of products.

Level One products allow PC users on industry-standard LANs, including those from Banyan Systems, Inc., Novell, Inc. and 3Com Corp., to access Wang Integrated Image Systems and Wang Office applications on the VS computer. Level Two products enable the user to construct enterprise-wide networks that support strategic applications via the client/server model, the company said.

"This means users can have a very standard imaging system on a LAN and also maintain their VS for other applications," said Scott McCready, an analyst at Framingham, Mass.-based International

Data Corp.

Peter Forbes Pollack, managing director of MIS at Financial Security Assurance, Inc. (FSA) in New York, said Open/Server capabilities are "crucial to our environment." FSA has been beta-testing Open/Server products since June.

FSA has four Banyan Virtual Networking Software (Vines) LAN installations scattered across the globe and anticipates providing end users with access to office automation, electronic mail and client-tracking system applications currently residing on a VS 10000 computer.

"We want to hook everyone into the mini in a transparent client/server envi-

ronment," Pollack said, adding that the Open/Server products allow the host system to participate as a peer in server-to-server communications.

Other users are adopting a wait-and-see attitude. Tony Bishop, a manager at Ford of Europe, based in Essex, England, said the product line may protect Ford's heavy investment in Wang systems: "We're hoping that Open/Server will help us position ourselves from a mini host to a LAN server environment." Ford of Europe currently has more than 270 Wang VS midrange computer installations and is piloting an imaging application for its customer service program.

Wang also announced OEM and joint development agreements with third parties to support Open/Server, including an agreement with Novell for Wang to resell, service and support Novell's Netware product line; an OEM agreement with Proteon, Inc. that allows Wang to market Proteon's Pronet 4/16 token-ring twisted-pair networking products; and an agreement with Oracle Systems Corp. for a new version of Oracle for Wang VS, a relational database management system.

"Last year, everyone was starved for information on both the company and the products," said Matthew Gillman, president of USSWU. "This year the atmosphere is calm and professional."

Borland one-two aimed at Lotus

BY JAMES DALY
CW STAFF

SCOTTS VALLEY, Calif. — Borland International delivered its latest salvo against struggling Lotus Development Corp. last week when it began shipping a more powerful version of its Quattro Pro spreadsheet program.

The introduction of Quattro Pro 2.0 continues Borland's intensive campaign to unseat Lotus' 1-2-3 as the longtime king of the hill in the spreadsheet world.

Borland also delivered a follow-up punch with the announcement of an aggressive enticement plan allowing users of competitive spreadsheet packages to swap over to Quattro Pro 2.0 for \$99.95.

Borland's previous offensive appears to be making strong headway against Cambridge, Mass.-based Lotus, which last week released third-quarter earnings that were down sharply from last year [see story page 7]. Since early 1989, Borland's share of the spreadsheet market has leaped from 5% to approximately 25%, according to Dataquest, Inc.

Many of the half-million Quattro Pro units sold since its introduction this year appeared to have been bought by disgruntled Lotus users. A study conducted by Vista Marketing Research in Oakland, Calif., indicated that more than 80% of Quattro Pro users previously worked with 1-2-3 for their spreadsheet needs.

Some new Quattro Pro users said they switched from 1-2-3 because Lotus has become difficult to deal with. "We've become very disappointed with Lotus," said Carl Hane, head of microcomputer application systems at MCI International, Inc. in Rye Brook, N.Y. "Their support structure is very bad, and they don't seem to be willing to listen to their customers when it comes to product enhancements."

Choose the project management system that goes the distance.

Every project encounters a few obstacles along the way.

As a manager, it's up to you to rise above them. Live up to your commitments. Bring your project home on schedule and budget.

Now, there's a project management system that's ready to go the distance with you—Project Workbench® Software - Release 3.1.

The more complex your project, the more difficult your mission, the more you need the power of ABT's Project Workbench.



Whether you manage one project or an entire department, the system gives you better control over resources than ever before. Assign people to tasks the way you want them to work. Shorten project duration and smooth out the workflow.

The fully integrated Project Analyzer™ lets you monitor trends, measure performance, view status, and track "earned value."

Create reports and analyze your entire project the way that makes the most sense to you and your team.

Project Workbench gives you the power to go far beyond the basics—blending peak performance with the highest level of usability.

See how far you can really go. Call ABT or your local dealer today.



APPLIED BUSINESS TECHNOLOGY CORPORATION

Call 212-219-8945 for:
 Free seminar dates
 More information

©1990 Applied Business Technology Corporation • 361 Broadway, New York, NY • Hardware Requirements: IBM PC, XT, AT, PS/2 or compatibles. PC/MS DOS 2.0 or higher with hard disk and min. 640K RAM. Project Workbench is a registered trademark and Project Analyzer and the ABT logo are trademarks of Applied Business Technology Corporation.

INTRODUCING FOCUS FOR AS/400™**THE SYSTEM THAT
REWROTE HISTORY
CAN NOW WRITE
4GL REPORTS.**

IBM's most successful midrange system launch ever has just reached a new milestone. Introducing FOCUS for AS/400.

Now you can take advantage of the number one 4GL to write reports and develop applications. In a tenth of the time it takes with RPG and COBOL, FOCUS not only reduces your backlog, it greatly expands the range of applications you can write.

And your investment in existing data and applications is protected, because FOCUS can automatically access the OS/400 databases and any System/3X files.

What's more, any FOCUS application can be ported between PCs, the AS/400 and mainframes. This makes FOCUS the ideal development tool for both distributing

applications and cooperative processing.

And FOCUS is the only 4GL that runs on all IBM platforms. In fact, Information Builders is an IBM selected SAA development partner, as well as an authorized Application Specialist for the AS/400. So you can always count on Information Builders for advanced SAA-conforming product development.

For more information, call us at 1-800-969-INFO. Outside the U.S., call 212-736-4433, ext. 3700. Or write to Information Builders, Inc., 1250 Broadway, New York, NY 10001. With FOCUS for AS/400, the system that rewrote history now holds even greater promise for the future.



This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

HP's RISC puts unprecede HP's NewWave Office puts



nted power within your reach. it within everyone else's.



With most computers, you have to give up power to save money. And whatever level of power you settle for, it's usually difficult for anyone but an expert to use.

Hewlett-Packard has a better way.

Our full line of RISC-based computers offers a wide range of power levels. At prices that let you base your choice on performance rather than budget.

And when you add HP's NewWave Office system, people can put this power to use quickly and easily from their desktop PCs. Which leads to the kind of productivity computers have always promised, but rarely delivered.

37 computers give you the choice of power you need.

That's a pretty impressive number of RISC systems. But the numbers that will impress you more are right on your bottom line. Our RISC minicomputers start at under \$15,000. Our high end of the power spectrum gives you mainframe performance at minicomputer prices.

Of course, the initial price is only one part of the equation. Since RISC architecture is simpler, it's fundamentally more reliable. And that means lower maintenance and service costs. In short, a dramatically lower cost of ownership.

If you think you can get these advantages from DEC and IBM, think again. DEC doesn't offer a complete range of RISC systems. And IBM only offers RISC technology in workstations.

The competition can't offer you the same level of software compatibility, either. If you went with IBM, you'd have to migrate across different families to even approach

the range of computing power we can provide in a single compatible HP systems family.

Finally, power that people find easy to use.

That's the whole idea behind HP NewWave Office system. Its unique object-based technology lets all of your information resources work together. And gives users a consistent interface across mainframes, minis, workstations and PCs.

It also integrates information from your current applications and integrates existing DOS applications, regardless of the vendor. IBM OfficeVision doesn't. What's more, HP NewWave Office is based on industry-standard networking, and runs on HP's UNIX® system-based computers, HP 3000 systems and OS/2 operating systems.

Beyond this, HP NewWave Office incorporates an extraordinary new "agents" capability. Agents can handle a wide range of sophisticated tasks. For instance, they can automatically gather data, analyze it, generate a report and distribute it.

The net result of HP's approach is this: Applications and information are right where people want them—at their fingertips. Which puts real power where it's needed most. The kind of useful power you always hoped to get out of your company computer system.

Call us at **1-800-752-0900, Ext. 1477** for more information. We promise a very powerful experience for you, and for everyone else in your office.



ADVANCED TECHNOLOGY

TECH TALK

LCD patent in focus

In Focus Systems, Inc., said last week that it was awarded a patent for a high-resolution — 1,280 by 1,024 pixels or greater — monochrome LCD. Prior attempts of LCD makers to design high-resolution LCDs were hindered by inadequate refresh rates. In Focus Systems solved the problem by stacking two 1,280- by 512-LCD panels, using a process called interdigitating. Each panel contains alternating rows of active and inactive pixels that are staggered so that each active row aligns with an inactive row. Interdigitating the panels reduces the number of rows that must be refreshed by a single panel, making it possible to achieve the 60 times per second refresh rate that is needed for high-resolution display.

Star Wars medicine

Radiologists at Johns Hopkins Hospital claimed recently that a three-dimensional computer system adapted from movie animation technology has been used on nearly 3,000 patients in the past four years to improve treatment and spare many the pain and cost of surgery. A 3-D imager, developed by Elliot Fishman, associate professor of radiology at Johns Hopkins, and computer scientist Derek Ney, is based on Pixar computer technology that was used to create life-like animation sequences for such films as *Star Trek II*.

Complex concerns

In a survey commissioned by the Association for Computing Machinery, top scientists expressed doubts about the safety and reliability of complex computer systems. As such systems take charge of everything from phone calls to airplane flights, the scientists warned of an increasing danger of man-made disasters. The scientists also expressed fear that the misuse of computer models could lead the government to adopt disastrous policies in dealing with such topics as global warming and economic growth.

Chief publishing officer to the rescue

Drowning in a sea of paper, corporate America needs someone to take control

BY MICHAEL ALEXANDER
CW STAFF

Despite dreamy predictions to the contrary, corporate America has yet to move into the paperless office. Computer technology now makes it possible for anyone to design and produce reports, forms, white papers and umpteen other documents, sometimes with only a few simple keystrokes. As a result, business is drowning in a sea of paper and shouting for a lifeguard, someone who will take control of corporate publishing and stem the paper flow, according to some analysts.

That lifeguard, with the title of chief publishing officer, may soon move into the office next door to the chief information officer in most large corporations and conceivably even be one rung up on the management ladder, one analyst said.

Stemming the paper flow has become a priority at most large corporations because the costs of creating, printing and storing documents have gotten out of hand, said David Henry Goodstein, a printing industry analyst and president of Interconsult, Inc. in Arlington, Mass. "The economics are staggering." The corporate paper pile is growing at 4% to 6% per year, and the information on half of those documents is obsolete soon after it is printed, he said.

Mystery chief

Just who will likely be the chief publishing officer remains a toss-up, but it will probably be between IS and in-plant print shop managers. Right now, the odds favor in-plant print shop managers, Goodstein surmised. Only a small percentage of corporate information — primarily financial data — is automated and under the control of the IS manager. The overwhelming bulk of information remains on paper documents consisting of text and images, and that is the domain of the print shop manager, he said.

IS and print shop managers are each at opposite ends of the corporate document creation and publishing stream; what happens in the middle ground, where desktop computer systems will be linked with high-volume electronic printing presses, will determine who will get the nod to take over as chief publishing officer, said Ben Lusby, director of administrative services at Blue Cross and Blue Shield of the National Capitol Area. Lusby oversees desktop publishing and in-plant printing for Blue Cross. "It will depend on whether IBM or Xerox wins," he said.

IBM and Xerox, as well as other

companies, are approaching the paper problem from different ends of the spectrum, Lusby said. IBM and others are touting computer systems tied to increasingly powerful laser printers, while Xerox is touting high-volume, electronic printing presses with computer and other digital capabilities.

"I would say if there is a printer from IBM that solves the publishing

the middle ground between desktop and electronic printing systems. Ultimately, the task of overseeing corporate publishing will be taken over by a chief information officer because computing and publishing are no longer separate processes but one and the same, said William Clinton, who follows the electronic printing industry as the director of compound document services at BIS CAP International, Inc., in Norwell, Mass.

"The chief information officer is going to be responsible for a corporation's information and systems, but it is still going to need to have expertise in producing the final document and publishing it," Clinton said. "I don't see one replacing the other."

There are several levels of publishing in virtually every part of the organization, and each requires a different amount of end-user education and skill, Clinton said: "They will still need this guy [the print shop manager] controlling information going out of the organization because it will always be important to have consistency."

What the melding of these two systems portends is a new way of assembling and distributing information, which in turn will lead to new responsibilities for both the IS and in-plant print shop manager, he said. "Managers can no longer think of publishing in tradi-



Xerox's Docutech electronic printing press

need, you're going to see a [decentralized] data processing solution; if it is Xerox, it will be a centralized publishing solution," Lusby said.

Earlier this month, Xerox introduced an electronic printing press called the Docutech Production Publisher, which the company said bridges the gap between computer workstations and business publishing by combining advanced technologies in scanning, filing, printing, finishing and networking [CW, Oct. 8].

The two-ton electronic publishing system, which costs \$220,000, is capable of producing 135 laser-printed pages a minute at 600 dot/inch. The electronic press forces home the argument that IS and in-plant printing managers are closing in on common ground.

Already, Xerox is planning to make networking software available early next year that will link the Docutech to local-area networks running Novell, Inc.'s Netware. Xerox has also inked pacts with AT&T, Adobe Systems, Inc., Digital Equipment Corp. and Sun Microsystems, Inc., among other computer companies.

Common occupation

Lusby agreed with the notion that a chief publishing officer may one day be a common occupation in large corporations; he and his counterpart in IS already report to the same vice-president at Blue Cross, one indication that the two responsibilities are seen as being compatible, he said. However, "it is not likely" that the chief publishing officer would oversee both IS and publishing. "I can't imagine being that smart in both areas," he said.

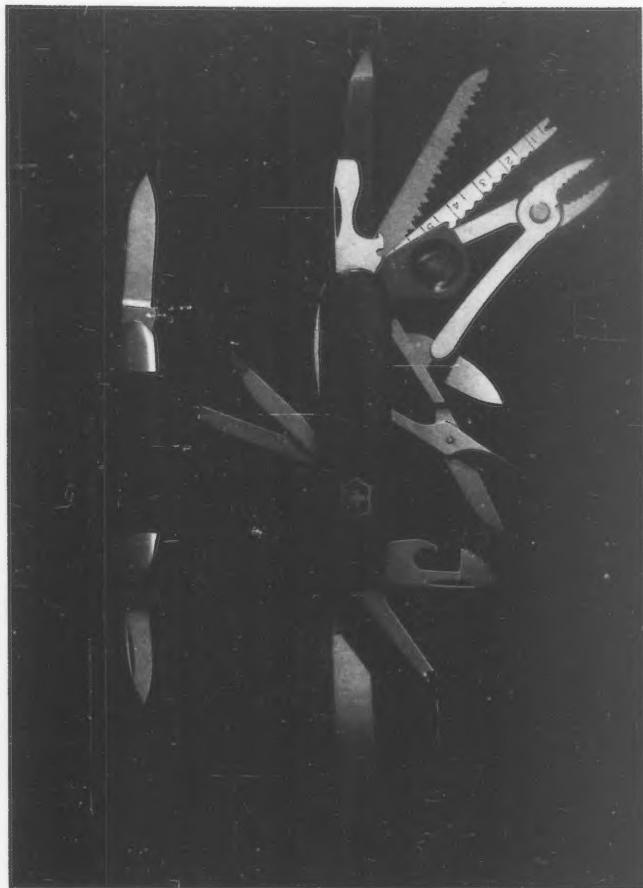
Other analysts are skeptical that a chief publishing officer will arise from

ONLY A SMALL percentage of corporate information — primarily financial data — is automated and under the control of the IS manager. The overwhelming bulk of information remains on paper documents consisting of text and images.

tional terms," Clinton said.

The future will be in "compound documents," in which the technologies of computer processing and publishing intertwine. This compound document will probably consist of text, images and multimedia effects. As an example, the insurance claims adjuster who now looks at static, two-dimensional images of an automobile will be handed "documents" that include full-motion video and other effects that will allow the adjuster to look at all facets of an auto, including the inside and undercarriage, Clinton said.

Ordinary Session Management vs. TPX®.



Ever hear your users clamor for session management? Probably not. But just try to count requests for faster access to multiple applications and databases. And for integration of applications.

Your users need more than conventional session management. They need a tool that delivers timely information in a form that boosts responsiveness and productivity. They need a network tool that takes them beyond session management. They need TPX from LEGENT.

TPX goes beyond session management to provide the power of Application Integration and present information from multiple applications on a single customized screen. And TPX can provide SAA/CUA compliant panels as well.

But perhaps the most exciting aspect of TPX is its efficiency. With its modular, streamlined, multiserver architecture, TPX provides functionality with no compromise to overhead. You get the power you need without exhausting resources.

Find out why over 1800 data centers worldwide have already chosen TPX for session management... and a whole lot more. Contact your local LEGENT

TPX: Beyond session management. account representative or call 800-323-2600 (412-323-2600 in Pennsylvania).

Free 30-day trials are available for MVS and VM environments.

LEGENT

Who says techies don't



digital

have power lunches?

No power suits or power ties.

You're just hungry for all the real power you can get.

Now you can get more than ever before.

Introducing Digital's DECstation™ 5000 workstation—the most powerful UNIX®-based RISC workstation we've ever offered.

COME AND GET IT. IT'S HOT.

Everything about the DECstation 5000 Model 200 workstation says speed, power and leadership performance.

For starters, it's driven by the MIPS R3000 CPU chip which supports 8-120 MB of



memory—that's more than you get on any other desktop workstation.

Looking for spectacularly hot graphics? Take a good look at the DECstation 5000 Model 200 workstation.

You can choose from a wide array of upgradeable graphics



options. From simple frame buffers to high-speed accelerators for visualization—just what you need for 2-D, 3-D, imaging and high-compute tasks. And if you want to run with even more power, we offer still more options. Like the incredibly fast FDDI fiber optic link. Or the industry's fastest open bus, the 100 MB/sec TURBOchannel™, introduced first on DECstation 5000 Model 200 workstation.

One more powerful incentive: it's very competitively priced.

If you get the idea the DECstation 5000 Model 200 workstation gives you the power you've only dreamed of right at your desk, you're getting the picture.

OPEN FOR BUSINESS.

Besides providing the power you want, the DECstation 5000 Model 200 workstation provides you with a host of other things you need. The most

important of which is a truly open environment to operate in.

It comes with a choice of open, industry-standard buses: SCSI and VME. It supports key workstation standards for operating systems, graphics interfaces and network communications. And, of course, it's compatible with all other systems from Digital regardless of size or operating system. Just the things you'd expect from Digital, the leader in promoting standards for truly open computing.



Adherence to standards, plus speed and performance that's anything but standard. Digital's UNIX-based RISC DECstation 5000 Model 200 workstation.

For more information, call 1-800-343-4040 ext. 295.

We suggest you do it at lunch.

**Digital
has
it
now.**

EDITORIAL

Get comfortable

BUSINESSES BOTH BIG and small in San Francisco are nervous, and they have good reason to be.

Pending legislation seeking to protect VDT workers would saddle user companies with what they consider excessive and unwarranted costs. Bank of America estimated it would have to shell out some \$44 million to bring its 6,000 VDT workers into compliance with the proposed rules.

Proponents of the legislation counter by saying that those costs are a small fraction of the estimated medical expenses of treating injured VDT workers. This is an interesting counter, given that the number of workers who have suffered gross injuries directly attributable to VDT use at any site — well, suffice to say you could probably count them on one hand without affecting your typing speed.

Nonetheless, the legislation is not without merit and, in fact, contains some very compelling messages for all organizations that have workers who use VDTs.

Unlike the many unfounded outcries in the past that attempted to link VDT use to serious health side effects because of radiation emissions, virtually all the requirements of the San Francisco legislation deal with basic worker ergonomics: mandatory use of nonglare screens, adjustable chairs and tables, proper spacing of workers (although at five feet of space between each worker, the proposed requirement is perhaps a bit ambitious in this regard).

It is encouraging to see that the blind pursuit of — if not insistence on — proof linking VDT emissions with all sorts of maladies has petered out. There is absolutely no scientific evidence proving that electromagnetic radiation from VDTs is a health risk to operators.

Moving away from the emissions hysteria has allowed researchers to concentrate on the real culprits behind VDT worker discomfort — namely, the workplace environment.

Simply put, the workplace never really adapted properly to the introduction of VDTs, 90% of which occurred in the last decade. Office workers used to handle paper comfortably on a horizontal desk exactly 2½ feet from the floor.

Today, they read this information on blinking colored, curved screens that glare mercilessly in their faces. The workers don't move much. The workplace was never re-engineered to accommodate these basic changes.

Also, there hasn't been much hue and cry about the plight of office workers because of invalid assumptions that office work isn't dangerous because it isn't "heavy" work. Now that's changing.

So there are really two messages coming over the wires from San Francisco. The first is an affirmation of ergonomic requirements. The second is more vital to heed: Business either needs to get busy and start policing these matters on its own or risk having to accede to the demands of politicians. Which would you prefer?



LETTERS TO THE EDITOR

Intelligent design

Computers have found widespread acceptance in analysis and rendering applications in design. The common thread among these applications is the model. In mechanical design, the designer assimilates knowledge about the task (functional specifications) and the world (experience) and produces a model (the conceptual design) that is successively refined and improved until it satisfies all the requirements of the functional specifications and the global constraints imposed by the world (detailed design).

While tremendous contributions have been made using computers to help designers optimize detailed, concrete models, their usefulness in aiding designers in creating models has been limited, particularly in the area of mechanical design. This is because model creation requires the ability to reason abstractly — something uniquely human — and because computers have been traditionally used to manipulate details rather than ideas.

We should begin to explore the requirements of knowledge representation for conceptual design with the ultimate goal of bringing the synergistic power of man and machine together as early as possible in the design process.

Adam Starchild
Ashland, Ky.

Objection

Regarding the In Depth article on object-oriented programming [CW, Sept. 17], it should be understood that there is a difference between object-oriented programming and database de-

sign. The impact of database structure on how a system is programmed is important, but it is only a side issue; discussing how object-oriented technology will "compete with" relational technology is missing the point.

Object orientation does not have its origins in the programming language C++: It goes all the way back to Simula67, which is the first language to support the "class" language construct.

I understand that it is good to give a simple and meaningful description, but at what expense? Do we want misinformed IS professionals out there thinking object-oriented programming is just for writing database-oriented systems and that it must be done under Unix?

I urgently request that you publish a follow-up article that is truly "in depth" and accurate. Articles such as this one contribute to the smoke surrounding object orientation.

Philip W. Hall
Software Engineer
Advanced Manufacturing Systems Division
Cincinnati Milacron
Cincinnati, Ohio

Personal problems

I was intrigued by the article by Dennis Noonan on the Viewpoint page [CW, Sept. 10]. As I was reading it, I couldn't make up my mind if he was being serious or very sarcastic.

With the advent of personal computing, many saw the opportunity to wrest control away from those who communicated in dataspeak and put it in the hands of the users. To do this, they did exactly what Mr. Noonan describes: They handed over thousands of dollars worth

of hardware and software to managers and clerical and, in essence, said, "Have a ball. Control your own destiny."

What resulted was a world of individuals who were already doing an eight-hour job in an eight-hour day and on top of that were expected to learn, pretty much on their own, something totally and absolutely foreign: DOS, Reboot, EDLIN, DEVICE=ANSI.SYS. Give me a break!

What these people want is exactly what they deserve: applications developed by we in management information systems who (supposedly) know what we're doing; applications which do the exact job needed to be done; applications which "come up" either when the machine is turned on or by pressing one function key; applications with Lots-O-Help that are forgiving, well documented and reliable.

Who are we kidding? PCs are never going to make the applications backlog go away. If anything, they're making them longer. We in MIS are writing the same kinds of applications we've written for years. We're just writing them for a different platform, with different tools and in much less time.

Eric S. Helland
Project Manager
Corporate Financial Systems
Woolworth Corp.
Milwaukee, Wis.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

Get ready for staffing squeeze

DUWAYNE PETERSON



Many of the older systems developed during the IS boom in the '70s and '80s have become obsolete

and require heavy maintenance to keep up with business needs. Companies find themselves dependent on employees who have been around since the systems originated. These people may be the only ones who completely understand such systems, and this scenario is more common than most companies would be willing to admit.

The fear of losing these employees almost forces us to consider providing bodyguards and limousines to ensure they make it to work.

Maintaining a supply of qualified personnel is a challenge that IS organizations are going to find increasingly difficult in the 1990s. Addressing this challenge in today's economic environment is especially difficult when many companies have had to downsize their work forces to reduce operating expenses.

As we move forward in this decade, the supply of qualified IS people will be decreasing as the demand for their skills increases. Factors such as the need to re-

Peterson is executive vice-president, operations/systems and telecommunications, at Merrill Lynch & Co.

engineer older systems, the emergence of new technologies and increases in the technical savvy of business users will foster this demand. Additionally, competition for IS people will strengthen as systems integrators and outsourcing firms enter the marketplace.

Now is the time to develop strategies to enable our companies to meet the future IS resource needs. The firms that achieve an advantage in the 1990s will be those in which a partnership is formed between management and employees.

The key to forming such a partnership is communications. Each individual in a company has dual roles of customer and supplier. Managing the dynamics of this dual role involves the identification of customer requirements and ensuring that the right things are done to satisfy them. Basic employee requirements include the following:

- The desire to work for a company that is respected both internally and externally.
- Open communication with management.
- Challenging goals that are aligned with organization and customer/supplier goals.
- Responsibilities and the power to carry them out.
- Recognition for a job well done and resulting job security.

The best place to look for resources to meet future IS skill demand is in your own organizations. Employee surveys will tell

you what the requirements of employees are, how they prioritize them and how good a job your company is doing at meeting them. Salary benchmarking is also important to ensure that your company is compensating

hierarchical management by function to a flatter organization aligned to technologies and products.

Management development programs are also needed to prepare future managers and enhance the skills of current ones. Policies that provide for job rotation and cross-functional training will facilitate individual

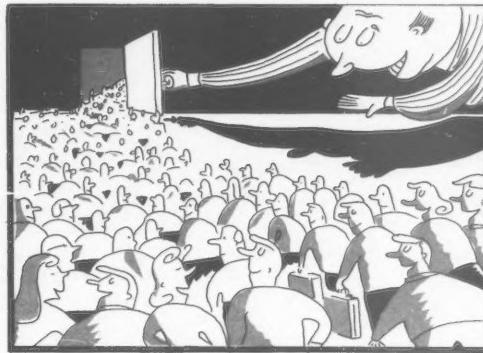
vance women and minorities.

As these changes come about, a greater effort must also be made in the area of work/family policies. Flexibility in work schedules is needed for mothers and fathers to raise families and also to provide care for aging parents. With the technology available today, it is possible for many people to do some work from home, work flexible hours or even share positions.

Many of the things that need to be done to keep qualified IS employees are the same as for any other employee. The difference is in the greater need for training in both technical and business areas.

In many cases, IS people are bright and creative and often introverted. These individuals thrive on opportunities to experiment with the latest technologies and should be given opportunities to discover new solutions that can help companies support new business opportunities.

Some people will say this is all well and good, but budgetary pressures will not allow these types of programs to be pursued. To these people, I say good-bye, because their organizations are doomed to extinction or second-class status. It's time for executives to lead and provide a workplace where people can operate with dignity and professionalism. The smaller work force of the coming "Baby Bust" generation will put a greater emphasis on human resources, and the way that resource is managed will make the difference in the marketplace.



M.E. Cohen

on a competitive basis.

Aligning IS strategies with business strategies can help determine future skill needs. As new technologies are introduced, many IS people will need to be retrained. During the next decade, the roles of programmers and systems analysts will change to that of a business analyst. In addition to technical training, these people will also need training on the business operations and functions.

The structure of organizations is also changing from the

growth and reduce the risk of becoming dependent on one person who has always done a certain job.

The Census Bureau has spoken about the "Workforce 2000," which will be characterized by a majority of women and minorities. Preparation for this change makes the effectiveness of equal employment opportunity programs critical. These policies must evolve beyond their current level of ensuring equal opportunity to ensuring that special efforts are made to ad-

pect of the new role of IS executives, and he wanted to share in leading his colleagues — not necessarily to outsourcing, but to that new role.

One enthusiastic disciple was



Biddle envisioned a transformation in IS management

Avon IS chief Ray Perry, who is now a vocal opponent of outsourcing. But Avon looked long and hard at it, then made other changes — data center consolidations — that now save the company \$3 million a year.

Perry has publicly credited Biddle with sparking the thought process that led to those savings. Biddle wasn't so much pro-outsourcing as he was pro-effective

IS management.

Biddle clearly enjoyed the limelight but eventually found the conference circuit just too demanding. The outsourcing trend he helped create had turned into something of a monster, with a conference every month, or so it seemed, and he put the brakes on public speaking for a while. He had more on his plate back at the office, too — some new non-IS responsibilities at American Standard that exemplified the emerging CIO role, of which Biddle was a model.

Biddle loved to look ahead. At the end of our discussion on that January morning in New York, I remember Biddle sitting back in his chair across the coffee table and musing about the future of IS management. He saw it evolving into something very, very different in the 21st century, and he even speculated that the concept of an IS function might disappear altogether.

Whatever transformation our profession will undergo in the years to come, I'm sure that Gary Biddle would have played a big part in it. It's a real shame that he won't be with us to watch it happen.

Gary Biddle: A thinking man's IS chief, a friend

CLINTON WILDER

During the unhappy task of doing interviews for last week's *Computerworld* story about Gary Biddle's death, I found a familiar refrain among those who knew him. Whether the person was a fellow IS executive, consultant or vendor, I consistently heard, "But you know, we had more than a business relationship. I regarded him as a personal friend."

The late vice-president of IS at American Standard had that kind of effect on people; he certainly did on me. He was not a gregarious, backslapper type, but he was genuinely warm and keenly interested in other people's ideas. And he was very happy to share many of his own.

As we all know, however, there are plenty of IS visionaries out there now working for new companies or consulting firms because they lacked the political skills to implement the vision. Not Biddle. Eastman Kodak IS executive Henry Pfendi paid him perhaps the highest compliment possible to bestow: "He practiced what he preached."

Wilder is *Computerworld's* senior editor, management.

After I became *Computerworld's* senior editor of management in early 1989, Biddle was the first IS executive who I profiled. Our 90-minute interview in his quiet Manhattan office was one of those sessions that a journalist lives for — when the interview breaks the boundaries of question-and-answer to become a truly engaging conversation, a sharing of intellect.

When I pulled out that profile for background information to write his obituary 10 days ago, I saw that I had written, "Gary Biddle is one of the deep thinkers of the IS profession."

As we all know, however, there are plenty of IS visionaries out there now working for new companies or consulting firms because they lacked the political skills to implement the vision. Not Biddle. Eastman Kodak IS executive Henry Pfendi paid him perhaps the highest compliment possible to bestow: "He practiced what he preached."

Biddle's intellect was impressive, but what made him effective was his ability to talk air brakes and air conditioners. He knew American Standard's business inside and out; he had worked there since age 18 and spent his early career in manufacturing.

So when he talked about coordinating information technology with business strategy, senior management listened. It was a two-way street; because Biddle knew he had that credibility, he didn't have to worry about guarding his data center empire. That led to American Standard becoming the first major proponent of outsourcing, 1990s-style. Biddle didn't farm out the whole ball of wax but instead identified CPU cycle time as a commodity that could be run on a Genix mainframe in Pittsburgh as easily as an American Standard mainframe in New Jersey.

Once American Standard's outsourcing became publicized, Biddle received hundreds of phone calls — many from CEOs who wanted to know more. And for many of them, Biddle obliged. He openly shared what his company had done. Biddle viewed outsourcing as one emerging as-

Northwest Airlines' DB2 development gets off-the-ground fast!

Northwest's largest DB2 application, the Passenger Revenue Accounting system (PRA), will track 260,000 tickets daily and save millions of dollars annually through revenue enhancements and productivity gains. Northwest is using BMC Software's DB2 Masterplan™ products to get PRA off-the-ground and flying fast.

Northwest uses BMC Software's DB2 MASTERMIND™ administrative products:

- **DB2 ALTER™**—Changes and migrations within DB2 don't put Northwest in a holding pattern. DB2 ALTER makes DB2 flexible.
- **DB2 CATALOG MANAGER**—Northwest takes appropriate safety precautions, maintaining integrity with BMC's unique DROPRECOVERY option.
- **DB2 DASD MANAGER**—Northwest uses the comprehensive statistics and historical data features in DB2 DASD MANAGER for trend analysis that keeps their system at optimum performance.

And, Northwest uses BMC's DB2 reorganization utility:

- **DB2 REORG PLUS**—Northwest calculates that reorganization time flies by up to 36 times faster than with the standard utility.

Northwest Airlines counts on BMC Software for products and support that make their productivity soar and their system availability reach new heights.

Take off with the leader

Find out how your DB2 applications can get off the ground faster. For more information on these and BMC's other DB2 products, or to begin a 30-Day-Plus Free Trial, call BMC Software, Inc., toll free at

1 800 841-2031,
or FAX your request to:
713 242-6523.

BMC
SOFTWARE



IBM is a registered trademark of International Business Machines Corp.
DB2 is a trademark of IBM Corp.
© 1990 BMC Software, Inc. All rights reserved.

Internationally, contact one of BMC's wholly owned subsidiary offices in:

Australia	Denmark	England	France	Italy	Japan	Spain	*West Germany
(613) 819-6733	(45) 44 68 22 00	(44) 276 24622	(33) 1 48 77 77 77	(39) 2 481 93850	(81) 3 837 8651	(34) 1 639 30 62	(49) 69 664 060

SYSTEMS & SOFTWARE

Finally coming into its own

Reverse engineering technology makes headway into IS organizations

ANALYSIS

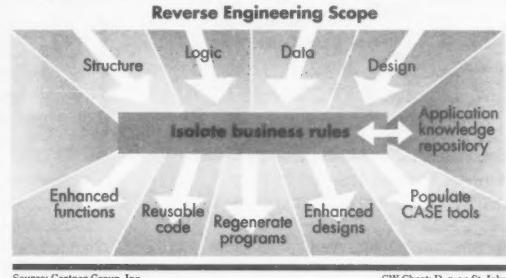
BY JOHANNA AMBROSIO
CW STAFF

Users who are beginning to experiment with reverse engineering and re-engineering tools report top-notch results. But they also say the process is slow going and hard to get one's arms around.

The experience is remarkably similar to what early users of computer-aided software engineering (CASE) tools went through several years ago. The re-engineering and reverse engineering software markets are just beginning to take shape, with increasing numbers of vendors and tools (see story page 37). But because no single vendor provides a complete solution, users must rely on a mix of tools from different sources.

Rules of business

Identifying business needs lies at the heart of reverse engineering



Source: Gartner Group, Inc.

CW Chart: Doreen St. John

Another similarity between CASE and these other technologies is that "they have been overpromised and overhyped," said Marc Fey, chairman of XA Systems Corp., a vendor in Los

Gatos, Calif. As with CASE, definitions for re-engineering and reverse engineering vary widely. Ask five different experts for definitions, and you are likely to get five different answers.

Infodata upgrade links DBMS, workstations

BY ROSEMARY HAMILTON
CW STAFF

Infodata Systems, Inc. rolled out an updated version of its text management system last week that provides workstation support and links to relational database management systems.

Current Inquire/Text users who were contacted said they are anxious to take advantage of the added functions. Company officials said Release E is now shipping, and its workstation support component will be available next month.

Initially, the company will of-

fer Microsoft Corp. MS-DOS support. It plans to offer IBM OS/2 support but did not specify a date.

Inquire/Text provides storage and search facilities for textual data. Unlike an imaging system, it does not provide a view of an actual document. But it also provides higher level search and retrieval capabilities than some imaging systems.

"It's probably the best release we've seen in a number of years," said Richard Stevenson, manager of database administration at Burroughs Wellcome Co. in Research Triangle Park, N.C.

"There are some big changes in there."

Burroughs, which has been using Infodata's software since the early 1970s, is particularly interested in the SQL Bridge facility, which it recently beta tested. The company started using IBM's SQL/DS mainframe database earlier this year, and Stevenson said the Infodata tool will allow users to merge data from Inquire/Text databases and SQL/DS into one document.

Armstrong World Industries, Inc. is a new Inquire/Text user that hopes to bring in the workstation support soon. Tom Brown, a senior systems analyst, said Inquire/Text was selected this year to manage product information on-line. A pilot project was recently completed for the customer service department that would allow customer rep-

resentatives to search for product records on-line. Personal computer support would give customer representatives a more user-friendly front end to the databases.

Towers Perrin, a management consulting firm in New York, is hoping to begin testing the workstation support within the next month, according to Nancy Audino, supervisor of information resource management.

Audino said the company would like to eventually use the workstation support to help create "consultant workstations," so staff members can more easily search through Inquire/Text and use client data.

"We want to make it easier for them to get at the corporate intelligence on the system," Audino said.

Mainframe imaging ties take lead

BY SALLY CUSACK
CW STAFF

NEW YORK — Integrating information from mainframe applications with imaging systems was a mini-theme at the Imaging '90 show earlier this month, as vendors scrambled to dominate the limelight.

Bull HN Information Systems, Inc. stepped into the realm of document image management with Imageworks — a client/server-based suite of document management software optimally designed for Bull's DPX/2 family of Unix processors. It can run on other vendors' Unix systems, and programs can be developed on an IBM mainframe to subsequently function as a client to the Bull server.

According to Najah Naffah, director of Bull's multimedia product line, Imageworks incorporates several industry standard technologies, including DOS, MS Windows, Oracle and Transmission Control Protocol/Internet Protocol (TCP/IP), thus rendering it ideal in the large mainframe world of government agencies, corporations, banks and insurance companies. It would communicate with mainframes via TCP/IP.

The initial delivery platform for Imageworks is a Bull DPX/2 Unix server providing folder and document management, optical discs and jukebox management as well as communications for Zenith Data Systems personal computers. The PCs will function as clients connected via TCP/IP and Ethernet for image capture, retrieve and/or print functions.

Continued on page 36

LEARN DB2 AND SQL NOW.

WAITING FOR A BETTER OPPORTUNITY? -- THIS IS IT!!

STOP! DON'T WAIT ANOTHER SECOND.

PC SOFTWARE THAT WILL GIVE YOU A COMPLETE DB2/SQL EDUCATION PLUS

ONLINE REFERENCE TO EVERYTHING THERE IS TO KNOW ABOUT DB2 AND SQL

CENTAUR DB2/SQL TUTORIAL /"SMART MANUAL" ONLY \$79.95

INSTALL THIS PC SOFTWARE ON ANY HARD DRIVE IBM COMPATIBLE IN MINUTES. INCLUDES 3 SELF-PACED TUTORIALS: SQL PROGRAMMING, SYSTEM DESIGN/DEVELOPMENT IN DB2, AND RELATIONAL DATA BASE DESIGN. PLUS OUR UNIQUE FULLY HYPERTEXT AND CROSS-REFERENCED "SMART MANUAL" WITH A KNOWLEDGEBASE OF DB2/SQL INFORMATION. IE: PROGRAM EXAMPLES, ERROR MSGS, COMMAND SYNTAX, DESIGN GUIDELINES, ETC...

CALL TODAY 1-800-451-1392 OR 914-937-465 VISA/MC/CORP. INVOICE - ADD \$5 SHIPPING
TLM, INC., 420 WESTCHESTER AVE, PORT CHESTER, N.Y. 10573 ALL PRODUCTS, 30 DAY MONEY BACK GUARANTEE.

The IEF™ can help you develop unprecedented quality, prod



"The IEF is a superior tool for implementing Information Engineering because it integrates the entire process from planning through code generation. We're deploying the IEF throughout the corporation."

David V. Evans
Vice President
Director, Information Systems
J.C. Penney



"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enhancements to do. Our users got what they needed the first time out."

Mark Quinlan
Senior Programmer/Analyst
Huntington National Bank



"To meet the dramatically reduced time-to-market requirements for our products, we need high-quality systems that can be changed fast. That's why we've chosen the IEF as the CASE solution for our entire organization."

John Pajak
Executive Vice President
Mass Mutual Life Insurance



"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

John F. Mott
President
AMR Travel Services



"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

Giorgio Sorani
Division Head - MIS
Lubrizol



"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development.."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce



"We used the IEF to rebuild our aging Frequent Flight Bonus system. With DB2 tables of up to 52 million rows, we needed high performance. And we got it...98% of our transactions complete in less than 3 seconds."

Cloene Goldsborough
Director of Data Resource Management
TWA



"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

Develop information systems with productivity and maintainability.

The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

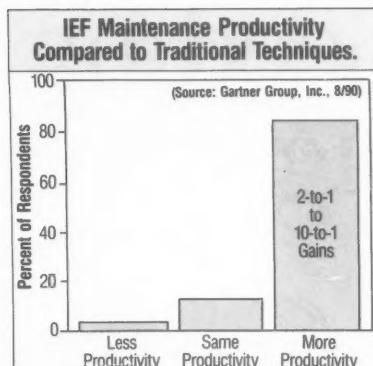
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that all IEF users who reported making application changes made all changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

More environmental independence coming soon—develop on PC, generate for DEC/VMS, TANDEM, UNIX.

The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will

follow. We are committed to increased environmental independence in support of the Open Systems concept.

We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's Cohesion—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

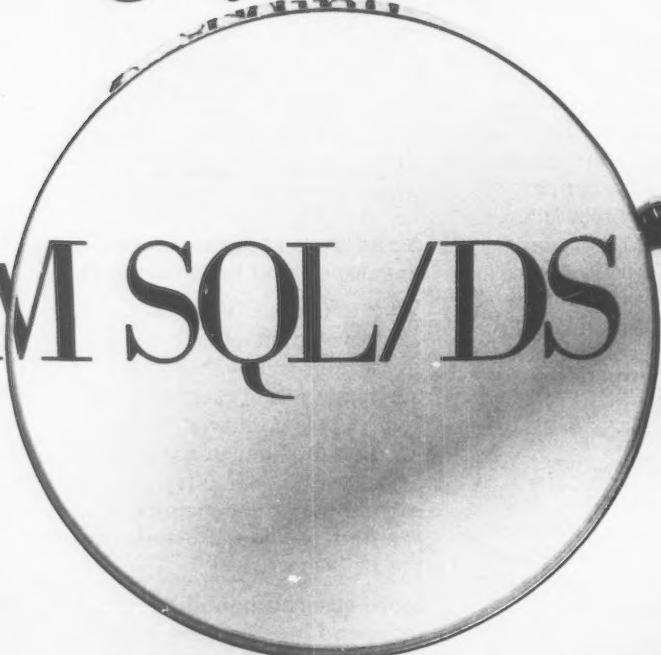
Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information, including a VHS video demo, call 800-527-3500 or 214-575-4404.

Or write Texas Instruments,
6550 Chase Oaks Blvd.,
Plano, Texas 75023.

TEXAS INSTRUMENTS

How VSE and VM users can have big relational power without needing a big system.



IBM SQL/DS

If you want your VSE or VM shop to have the edge that a full-scale relational data base can bring, IBM has good news for you.

IBM's SQL/DS (Structured Query Language/Data System) is a complete relational data base management system that gives you the leading-edge advantages you need.

It can increase your ability to capture, control, maintain and deliver the information that's vital to your business.

SQL/DS can help improve the productivity of your programmers and reduce your applications backlog. All while giving your end users better ways to access data more quickly and easily than before.

SQL/DS extends the same relational capabilities to VM and VSE that DB2™ gives MVS, in fact. It meets ANSI, FIPS and ISO standards and can handle high transaction volumes and complex data relationships.

It also lets you distribute data in cooperative computing environments. And it's a key component of SAA®.

In short, you can have everything you need to start using information as a competitive advantage.

You won't have to look far and wide to get big relational benefits like these, either. Just call your local IBM marketing representative, and ask about SQL/DS.

IBM

Multitier team attacks paper

ON SITE

BY SALLY CUSACK
CW STAFF

IDAHO FALLS, Idaho — A nuclear research facility here has procured an elaborate imaging system in hopes of organizing and restructuring several hundred million warehoused documents — a paper fallout that has been accumulating during the past 40 years.

"Whenever we needed something that dated back a few years, we literally sent a small army out to the warehouse to search for it," said Bernard A. Rando, principal information science specialist at EG&G Idaho, Inc. The federally funded facility recently installed three Wang Laboratories, Inc. Wang Integrated Image Systems (WIIS), with a total value reportedly exceeding \$800,000.

The unusual twist here is that the EG&G also relies on an IBM 3090 Model 200 mainframe running in the MVS/ESA operating environment, according to

Rando, which will connect with the Wang system via Norms, a mainframe-based document control and records management system from Southern Electric International (SEI). Norms links up to the imaging platform via 802.3 Ethernet lines to allow documents that are scanned into the Wang system to be addressed by the mainframe.

When a document is scanned in, Rando said, the interface between Wang and Norms identifies the document and the Wang machine on which it resides. Then Norms hands the address back to the Wang machine, and the imaging applications put the record up on the screen for the user. So far, more than 10,000 pages have been scanned in three weeks, he added.

EG&G chose Norms because of sophisticated search and retrieval capabilities; the facility anticipates being able to search through 3 million records in 1.5 seconds.

"The IBM software just reaches out to the Wang system

and passes out addresses," Rando said, explaining that the search mechanism resides within the Norms program and the storage is on the Wang side of the house, via Wang's Image/CICS program.

The hardware portion of the WIIS installation includes two VS 5640s and one VS 8220 com-



puter, two Wang 5½-in. optical disc jukeboxes, four document scanners, 12 image-capable workstations and two laser printers.

On the software side, EG&G is using Wang's Pace database management package, Wang Open/Image-CICS, Wang Office and Office/Profs Gateway, 802.3 local-area network connectivity and Open Systems Networking. All the systems are connected, Rando said. He added that

EG&G also plans to communicate with other agencies via Wang's VS Fax gateway, which permits facsimile transmission of images from a Wang VS mini-computer.

"One of the priorities we had was flexible software for application development," Rando said. "We need to be able to change this on the fly. The biggest problem we've encountered during the entire process is trying to control the growth of this technology."

Rando began researching optical disc technology more than two years ago, trying to determine which platform would be best for EG&G and its employees.

The mammoth site spreads out over 894 square miles — about the same size as Rhode Island, Rando noted — and employs approximately 12,000 people. There are more than 10,000 users networked into the IBM mainframe, and security permitting, there will be sitewide access to the imaging system when all is said and done.

After two months in beta testing, the WIIS implementation went into official production mode last month. EG&G has a

five-year plan to scan in all the warehoused documents, and according to Rando, it will need additional manpower to complete this task.

"We will also need between five and eight more scanners," he noted, adding that he has also received requests for additional imaging systems.

As the prime contractor for the Idaho National Engineering Laboratory (INEL), EG&G provides facility services to other research contractors at the INEL site, including data processing, mail and security. The need for configuration control, records management and compliance with federal and state record retention regulations were the primary forces driving the move to imaging technology, the company said. Wang won the contract in a competitive procurement bid.

The U.S. Department of Energy headquarters in Washington, D.C., currently communicates with the IBM mainframe via Digital Equipment Corp.'s All-In-1 and IBM Professional Office System packages and will eventually connect to the Wang system through the mainframe, according to Rando.

Access ventures into text management waters

BY MARYFRAN JOHNSON
CW STAFF

Access Technology, Inc. made its splash as the leading spreadsheet vendor for Digital Equipment Corp. VAXs, but these days the Natick, Mass.-based vendor is casting its line into new waters.

Rather than concentrating solely on the joy of manipulating numbers, Access is broadening its scope with two new "groupware" text management products: For Comment and For Words. The \$32 million company is also itching to put its applications on Novell, Inc. local-area networks.

"This is a dramatic shift in their product strategy, but it's not a dramatic shift in company policy," said Ronni Marshak, a vice-president at Patricia Seybold's Office Computing Group in Boston. "Access has been making products for group usage, so the company has experience designing network products vs. stand-alone tools."

For Comment is a document review system, priced from \$375 to \$9,900, that enables work groups on networks of personal computers and DEC VAXes to read, comment on and revise a text document on-line.

For Words is a document retrieval system that gives

VAX/VMS users the ability to hunt through an on-line database to find particular documents. It costs from \$600 to \$25,000.

Grant writer's aid

One user planning to buy both products is William Wiseman, business manager at The Children's Museum in Boston. "I can see a direct application with For Comment in our grant writing," Wiseman said. "For Words could be put to immediate use by our more technical people, such as computer support staff."

The museum has about 80 users on a VAX 6000 Model 310, plus a dozen Decserver machines. Wiseman said that the VMS operating system has some of the features found in For Words, but not the flexibility of the Access product.

Allan Wood, the business applications coordinator at STS Consultants Ltd. in Northbrook,

Ill., is also pondering a purchase of For Comment for the engineering firm. "It could be a real nice fit into our environment," he said. "We'd be able to run it on all our VAX nodes" in four locations throughout the Midwest.

Wood said that although STS is already using Vaxnotes, a DEC conferencing software package, it is mainly used for on-line software documentation and lacks the document editing capabilities of For Comment. The Access product also integrates with several popular word processing packages, while Vaxnotes cannot.

One feature users at a recent Access convention in Boston particularly liked was the split-screen format in For Comment, which enables viewers to scroll up and down both the document and comments from reviewers.

The original version of For Comment was introduced by

Broderbund Software in 1986 and was hailed as one of the first useful work-group software tools for PCs. Access acquired an exclusive license to the technology, improved the user interface and added other functions.

"In this kind of market, with the recession and everything so tight, a software company can't just go to its existing customers and make money. They don't have as much to spend," Marshak said.

Analysts familiar with the new products praised them but said they needed better graphical presentation and the ability to run in windows.

Yet the market seems ripe for full text retrieval products at an estimated \$100 million last year, said Ann Palermo, an analyst at International Data Corp. in Framingham, Mass. "The problem with For Words right now is it only works on VMS," she added.

What IBM Can't Tell You About TSO.

1. How to cut TSO overhead by 47%

2. How to put CICS on ISPF menu.

3. How to concurrently have 3 ISPF's plus SDSF, INFO/MVS, RMF, DB2, SAS, QMF, and OMEGAMON on your terminal, with a single TSO ID in your TSO address space.

Since 1984, hundreds of companies worldwide have selected MultiTSO to improve TSO performance and productivity.

Call for more information and a FREE 30 day trial.

Technologic Software Concepts, Inc.

16842 Von Karman - Irvine, CA 92714
(714) 863-7080
FAX (714) 863-7055



System integrator
Response time
IS customer

Integrity is being questioned. Time is degrading. Users are considering alternatives.

Improve service. Increase productivity. Reduce costs.

These problems follow IS managers wherever they go.

There's never been Today, LEGENT Corporation is supplying the technologies and strategies that successfully support the "do-more-with-less" objectives of IS Management.

With LEGENT technologies, many IS managers are quantifying and assessing their entire environment. Then they further exploit LEGENT solutions to automate and improve datacenter performance, enhance system and network productivity, and automate and manage the application development life cycle. Resulting in increased productivity, improved user service levels, and a reduction of overall IS costs.

IS Management. Performance Management. Operations Management. Software Management. And Network Productivity. Five technologies from one company committed to building an effective partnership to ensure the success of the IS enterprise.

For more information, call LEGENT at 1-800-326-1992.

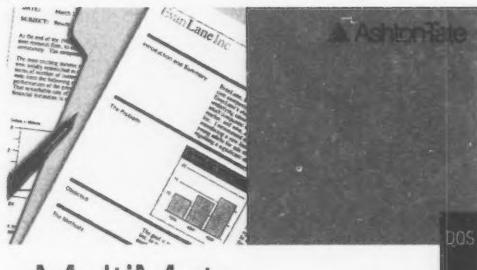
 **LEGENT**

Introducing The First Word Processor Designed By An Army, A Telephone Company, Genetic Engineering, Atomic Research And, Of Course, The IRS.

It's true. A whole army of Fortune 1000 companies and government agencies are designing future versions of MultiMate. Including an actual army. And a think tank. A band-aid maker. Oil companies. And five major insurance firms.

The 140 members of the MultiMate Customer Advisory Board want cross-platform compatibility. So we're developing versions of MultiMate for Windows, OS/2, UNIX and Macintosh. These compatible programs will reduce training and support costs, while providing consistent, easy-to-use word processing across your entire computing environment.

The information professionals on the Board are also



MultiMate

familiar with other popular word processing programs. They know which features are productive, which aren't, and what's missing. By listening to their advice, we give you a word processing product that's second to none.

Accomplishing this is a continuing process, but we've already added advanced features to MultiMate version 4.0 that include the industry's

leading grammar checker, built-in electronic mail, a drawing function for creating forms, graphics importation and editing, plus the most extensive file conversion capability in the business.

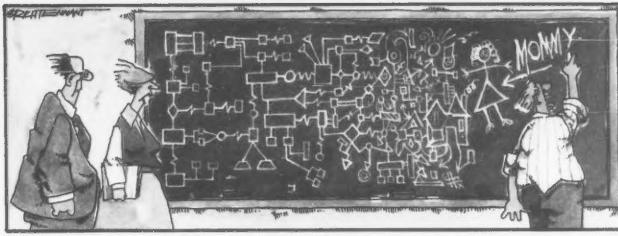
We're also committed to regular, timely upgrades to keep pace with today's emerging technology.

For more information on the future of MultiMate, call 1-800-437-4329, Ext. 1909. Or upgrade to MultiMate version 4.0 now for only \$75 by calling 1-800-2ASHTON.

If you want your word processor to be all that it can be, join the army of companies that have made MultiMate a major industry standard.

 Ashton-Tate®

Trademark Owners: MultiMate, Ashton-Tate, Ashton-Tate Logo/Ashton-Tate Corp. Other product names used herein are for identification purposes only and may be trademarks of their respective companies.
© 1990 Ashton-Tate Corporation. All Rights Reserved.



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of \$38.95* per year — a savings of 62% off the single
copy price.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: Home Business New Renew Basic Rate: \$48 per year
* U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Manufacturing/Trade
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 75. User Other _____
- 95. Vendor Other _____

(Please specify)

TITLE/FUNCTION (Circle one)

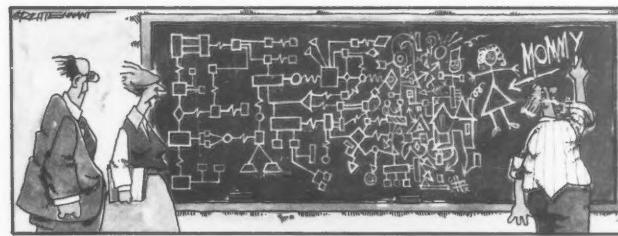
- 19. Chief Information Officer/Vice President/Asst. VP
- IS/MIS/DP MANAGEMENT
- 21. Dir/Mgr. MIS Services, Information Center
- 22. Dir/Mgr. Tech Planning/Adm. Svcs., Data Comm. Res. Mgr., Dir/Mgr. PC Resources
- 23. Dir/Mgr. Sys. Development, Sys. Architecture
- 31. Mgrs., Suprv. of Programming, Software Dev.
- 32. Programmers, Software Developers
- 80. Sys. Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 75. User Other _____
- 95. Vendor Other _____

(Please specify)

COMPUTER INVOLVEMENT (Circle all that apply)

- Types of equipment with which you are personally involved either as a user, vendor, or consultant
- A. Mainframes/Superminis
 - B. Minicomputers/Small Business Computers
 - C. Microcomputers/Workstations
 - D. Communications Systems
 - E. Local Area Networks
 - F. No Computer Involvement

E4043F-3



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of \$38.95* per year — a savings of 62% off the single
copy price.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: Home Business New Renew Basic Rate: \$48 per year

* U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Manufacturing/Trade
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 75. User Other _____
- 95. Vendor Other _____

(Please specify)

TITLE/FUNCTION (Circle one)

- 19. Chief Information Officer/Vice President/Asst. VP
- IS/MIS/DP MANAGEMENT
- 21. Dir/Mgr. MIS Services, Information Center
- 22. Dir/Mgr. Tech Planning/Adm. Svcs., Data Comm. Res. Mgr., Dir/Mgr. PC Resources
- 23. Dir/Mgr. Sys. Development, Sys. Architecture
- 31. Mgrs., Suprv. of Programming, Software Dev.
- 32. Programmers, Software Developers
- 80. Sys. Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 75. User Other _____
- 95. Vendor Other _____

(Please specify)

COMPUTER INVOLVEMENT (Circle all that apply)

- Types of equipment with which you are personally involved either as a user, vendor, or consultant
- A. Mainframes/Superminis
 - B. Minicomputers/Small Business Computers
 - C. Microcomputers/Workstations
 - D. Communications Systems
 - E. Local Area Networks
 - F. No Computer Involvement

E4043F-3



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



PRODUCT REVIEW

Solid case for Linc performance

Unisys Corp.

This is the fifth in a monthly series of performance benchmarks that for the next several months will focus on the integration of computer-aided software engineering (CASE) and fourth-generation language (4GL) products. The benchmarks are monitored by an independent team headed by David Whiteside, managing director of Computing Futures Ltd. and his associate, Prof. Eberhard Rudolph, formerly of the University of Auckland, for exclusive publication in Computerworld.

Each product is observed in action over a three-day period during which a vendor team solves the case study project costing system, an application that is familiar to most information systems professionals. The team's mission is to demonstrate the capability of the major CASE/4GL environments to deliver complete and complex

business solutions under "live fire" conditions. In this issue, we take a look at Unisys Corp.'s development tool set, which is centered around Linc Design Assistant (LDA), Linc, Mapper and its database DMS II.

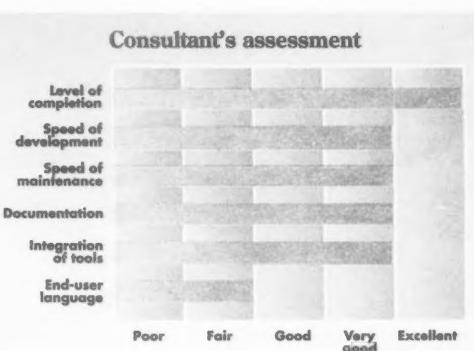
Carried out by Unisys at its corporate case center located in Malvern, Pa., its team of four professionals provided a comprehensive solution to the benchmark and earned it a total rating of "excellent" for the level of completion category.

The team required 18 hours to complete the benchmark and its enhancement. However, this time could have been reduced by two hours had it not been for the lengthy periods that were spent waiting for compilations, particularly during the enhancement stage. The overall effort of 42 man-hours was one of the fastest compared with previous solutions, frequently exhibiting "right the first time" results. Thus, we gave the speed of de-

velopment category a rating of "very good."

A similar performance was achieved for maintenance in areas where the team built on the existing high-level framework of Linc constructs. Therefore, the speed of maintenance was also rated as "very good."

The fast development speed was supported by high-quality documentation. Effective CASE graphics complemented well-indexed program listings. In addition, during maintenance, a reverse engineering capability ensured the integrity, even in



the high-level documentation. All things considered, a rating of "very good" was awarded for documentation.

The integration of the Mapper end-user tool is limited to the database level and is not covered by the LDA CASE tool. However, the Linc 4GL and the LDA CASE tools are fully integrated, providing bidirectional engineering support. For the level of integration, we gave the tools a rating of "very good."

Surprisingly, we found the end-user languages to be too programmer-oriented and not easy to comprehend by non-IS staff. Hence, the results may have suf-

fered from hardware problems that required a change of environment and a hastily co-opted team member. What we saw had to be given a mark of "fair" at best.

We saw a high level of accomplishment in most areas of the solution, but Unisys still has to give Mapper a face-lift in order to make it a broad end-user tool as well as part of its CASE environment.

In conclusion, Unisys has a well-integrated tool set that was especially effective in handling the more complex elements of the benchmark. It is unfortunate that the tool set is only available on Unisys hardware.

Development and maintenance report card

Performance in each area is graded from A (excellent) to F (poor).

ANALYSIS AND DESIGN: B

The team implemented the proven Linc methodology as the basis for analyzing and structuring the benchmark specifications. They were then able to directly implement the conceptual Linc solution using the Unisys LDA CASE tool. The Mapper end-user solution, however, could not be addressed by the CASE tool.

Strength: All have a fully integrated design philosophy.

Weakness: The CASE tools are available in single-user personal-computer mode only.

DATABASE SETUP: C

Only the data elements have to be specified in the CASE data dictionary. The database implementation was swift, but it was limited in its scope because of the many editing rules that have to be implemented in the Linc program logic area.

Strength: All physical data structures are generated automatically.

Weakness: There is no data dictionary support for the Mapper tool.

FILE MAINTENANCE TRANSACTIONS: B

The Linc default framework handled the simple screen processing in most cases. Screen scrolling required special attention.

Strength: Simple processes are handled effectively.

Weakness: It has unorthodox change and delete functions.

COMPLEX TRANSACTIONS: A

In the short time it took to complete the benchmark, a correct solution was derived with hardly any bugs. The Linc defaults also

gave adequate support.

Strength: Not much coding needs to be done.

Weakness: Time calculations are unsupported.

INQUIRIES: D

Linc and Mapper were each used to develop one of two inquiries. In both environments, the development process was lengthy and relatively cumbersome. Professional programmer skills were needed, particularly to extract the files for the Mapper solution.

Strength: It is easy for the experienced professional.

Staging the benchmark



Weakness: It is beyond the capability of the casual end user.

COMPLEX REPORTS: A

As with the complex transaction, Linc was able to handle intricate reporting requirements. The fastest time to date — three hours and 35 minutes — was achieved. It is interesting to note that two developers each took a section of the report.

Strength: There is great flexibility in report generation.

Weakness: There is none evident.

INTERFACE: A

The Ashton-Tate Corp. Dbase file was transferred as an ASCII file and edited before a Linc batch program transferred the

data into the Linc database. The task was completed in a short period of time and even uncovered a bug in the specifications.

Strength: External data can be dealt with easily.

Weakness: No standard Dbase interface is provided.

ENHANCEMENT: A

After an hour of analysis, the team implemented a solution to the enhancement requirement using Linc. They then used reverse engineering to reflect this low-level change in the upper-level design documentation.

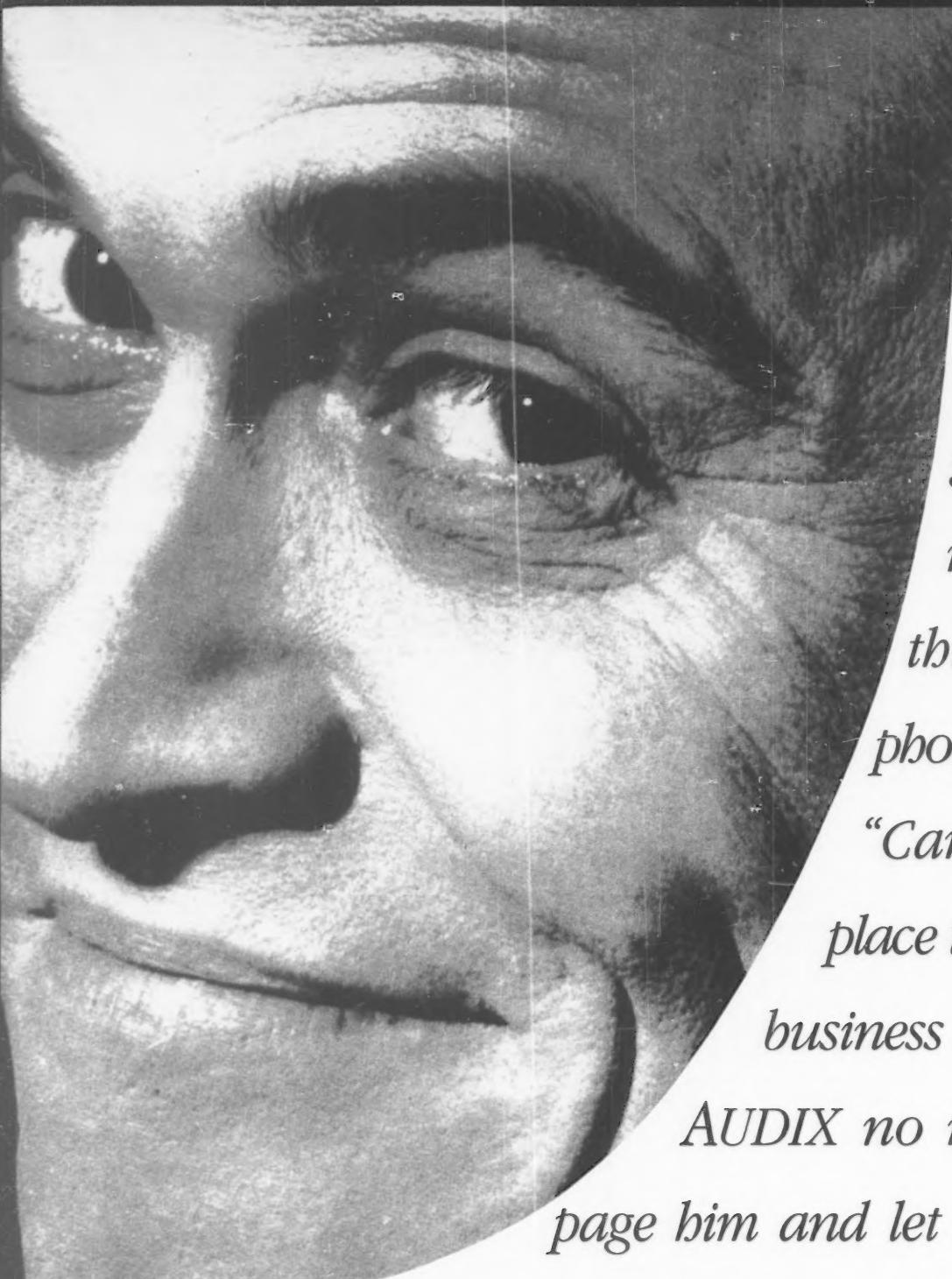
Strength: Linc methodology is geared for change.

Weakness: Recompilations can be lengthy and impose scheduling restrictions.

The solution was initially developed on a Unisys A6 mainframe, which was dedicated to the benchmark team and supported as many as 12 stations. The Mapper development had to be transferred to a Unisys A12 mainframe because the A6 microcode did not fully support Mapper.

Details of the product are available from Unisys Corp., P.O. Box 500, Blue Bell, Pa. 19424, (215) 986-4011.

Development World product briefings are based on a series of full solutions to the case study. They are prepared by leading vendors and published along with in-depth product analyses and consultants' test reports in Development World Libraries. Please see business reply card between pages 76 and 77 or fax (508) 820-0146 for a brochure.



We send

put an

And it

this smoke

gets there?

reason I'm

third call to

phone because

"Can I take a

place that has an

business calls don't

AUDIX no message is

page him and let him know

tant because aliens from Andromeda are

At this point I'm put on hold. And it is my hope that if

not currently suffering the indignity of the hold button.

AT&T AUDIX SYSTEM is compatible with other major PBX systems and Centrex. It features Caller-Routing, Personal Mailing Lists, and a host of other features you'll find in THE AT&T CATALOG — For more information or a free catalog call 1 800 247-1212, Ext. 111. In Canada call 1 800 387-6100.

up satellites like flowers to strangers. On one we electronic greeting card and addressed it to infinity. occurs to me, what if the people who might get signal from planet Earth aren't around when it What if they're in a meeting? And the only thinking this is because I'm on the tenth ring of the this supplier when someone finally answers the the ringing noise is ruining his lunch. He says, message?" And I say, "Tell Ray he needs to work for a AUDIX System from AT&T. Tell him 75% of all reach their intended party on the first try. But with missed. Tell him AUDIX features outcalling that can important messages are waiting. And this is impor- trying to reach him and they may not call back...." there is intelligent life somewhere in the universe, it is



Open systems escape scrutiny

BY J. A. SAVAGE
CW STAFF

Businesses that have embraced open systems have not justified the expense with reams of cost analysis, according to a report from the DMR Group, Inc. in association with Uniforum Association and X/Open Consortium Ltd.

Instead, companies use informal economic justification — the Bob Dylan approach. "You don't need a weatherman to know which way the wind blows," the report stated. More than 100 individuals in organizations that have bought or are in the midst of buying open systems were questioned. A secondary poll, with 2,375 general respondents, indicated the strength of the trend toward the open systems market.

DMR's studies found that 15% of the businesses polled were considering the use of open systems. Nearly one in six sites that already have Unix-based computers have explicitly adopted open systems standards. "The evidence is that the shift is occurring," said Don Tapscott, vice-president of DMR.

Among the findings are the following:

- More than half of the organizations that bought into open systems did so in the last two years.
- Price/performance may be the most important criterion, but users also want traditional vendor support and service.
- Vendors may say they adhere to standards, but users are actually keeping track of that conformance, either by developing internal expertise or hiring consul-

tants to validate vendor claims.

• The moves to open systems are either making management problems between central IS and distributed entities worse or raising them for the first time.

Despite the lack of cost justification, cost is still the most important factor, according to DMR. Almost as important, however, is that users feel the direction of open systems as the wind of the future, and they want

to be able to take advantage of open systems freedom. The report said there is a "striking" shift in the relationship between users and vendors — that users are empowering themselves by choosing open systems. DMR cited one case in which a customer had two vendors vying for its attention, suggesting that the customer buy the vendors' open systems hardware over its proprietary systems. The customer went one step further, taking the vendors' advice on open systems and buying systems from a completely different vendor.

While all these moves signal a change in the basic structure of IS, one of the most significant changes, and one which has yet to be played out, is that of a relationship between a centralized IS and departments. On one hand, with open systems, an organization reaps the utility of dispersed systems as part of a wider corporate system based on standards, according to the report. On the other hand, "most [managers] are working in the dark" because there is little experience with management forms that work best under such conditions.

Unisys, Chorus develop another version of Unix

BY JOHANNA AMBROSIO
CW STAFF

SAN JOSE, Calif. — Get ready for another version of Unix. This one, being developed by Unisys Corp. and Chorus Systems, Inc., is intended for high-end machines.

"This is not a product announcement; it is a technology announcement," said Jamie Riotti, director of engineering in Unisys' Unix Products Group. He said the operating system will run on a high-end Unisys machine that the company has not yet announced.

The partnership, announced earlier this month, has a goal of developing a Unix version "equivalent to what you have on today's mainframes," said Hu-

bert Zimmerman, chairman and founder of Chorus Systems in Beaverton, Ore. The operating system, which will be based on Chorus' kernel, will support distributed, scalable, fault-tolerant hardware and will provide a single system image and security features, he said.

The operating system will be compatible with AT&T's System V, Release 4. "Customers will not have to rewrite any applications," Riotti said.

The first release of the Chorus/Unisys software will be available in the first half of 1991. "It will find its way out in stages," Riotti said, with the final stage available in 1993. At that point, the operating system will support fully distributed computing.

Mainframe

FROM PAGE 25

"This product line is not limited to Bull accounts," says Nafah, with reference to ImageWorks positioning toward mainframe systems integration. He contends that the majority of imaging products currently on the market are positioned as self-contained, departmental systems operations, whereas the ImageWorks open architecture, client/server approach allows the image database to be placed in front of the mainframe for easy access to mainframe transaction-oriented environments.

ImageWorks is available through Bull's direct sales force, and pricing is determined by the systems integration implementation, the vendor said.

In other announcements, Information Builders, Inc. and Wang Laboratories, Inc. joined forces to premier Focus for Wang VS Image Gateway. The new product allows firms to incorporate existing data and applications on the mainframe as well as IBM Application System/400 minicomputers linked with Wang's imaging systems.

According to Focus, documents are stored and maintained on the Wang VS Image Server, and Focus for Wang VS and the Image Gateway transparently link the document image to data and applications on the mainframe and AS/400. This creates a screen-level data exchange between systems. Focus for Wang VS Image Gateway is available now, with prices ranging from \$1,658 to \$18,090, depending on the VS hardware platform.

Reverse

FROM PAGE 25

and for new applications. This process does things such as consolidating data definitions. Thus, where re-engineering involves reworking existing code, reverse engineering deals with higher-level definitions of processes and data.

If defining these ideas is tough, putting them into practice can be extremely rewarding. Tom Wheeler, an administrator at Aetna Life & Casualty's Personal Financial Security Division in Hartford, Conn., has been using re-engineering tools since 1986 to update an application containing 3 million lines of code. The application includes an online module, a 25-year-old master file containing information about every individual's property and casualty claim and a reporting module.

Wheeler said the maintenance staff for that application has been reduced from 28 to eight people, freeing up those

programmers to work on new systems. Also, the application's 15,000 data names are now down to about 2,000.

The next step, Wheeler said, is to reverse-engineer the logic and process definitions in the old application to allow them to be moved from Aetna's homegrown DBMS into IBM's DB2. "The pain is still wet," he said. "We're looking at everything. We know reverse engineering is part of our future; it's just not clear yet which tool we will use."

Maxine Glassberg, manager of Merrill Lynch's Development Technology Center in New York, has also been using re-engineering tools for some time with great success. She is now beginning to experiment with reverse engineering in some pilot programs. Early results indicate a 40% reduction in the number of lines of code and the ability to reuse 80% to 90% of the code that is generated.

However, there is a downside to all this productivity. Getting started can be difficult because it is not always easy to justify these

tools to top management, said one user who requested anonymity. "It's hard because the vendors don't always understand the business need behind the technology. We need to justify things by being able to cut dollars and head count."

Then, too, users must do a lot of their own work to coordinate the different software and steps involved. Merrill Lynch, Aetna and Pacific Bell, also working with re-engineering and reverse engineering tools, are using at least four packages from different vendors.

For the time being at least, these tools are only available for Cobol programs. Peter Van Opens, a systems coordinator at Northwestern Mutual Life in Milwaukee, has been re-engineering his PL/I applications manually. It took him and his staff 2,000 hours to restructure the code in an on-line query system. However, he said he is happy with the results — where it used to take 500 hours to make any changes to the system, now it takes only 50 hours.

Working with the right tools

A plethora of tools has hit the market for tasks such as extraction of data specifications and code analysis. While software aids for restructuring code have been around for eight years or so, the analysis tools are relatively new. These help users figure out what applications exist in their shops and which could most benefit from restructuring. Other packages help users identify what code is in existing systems, down to the detail of which code performs which function — a specific interest calculation, for example.

In this analysis category are such products as VIA/Center and VIA/Insight from Viasoft in Phoenix and Pinpoint and Inspector from Language Technology, Inc. in Salem, Mass. Another analysis package is Pathway from XA Systems Corp. in Los Gatos, Calif.; the company also sells DataTrek, a tool to help clean up data definitions.

Further, XA will soon announce System Analyzer, a systemwide way to analyze applications' component pieces and their relationship to one another. This information will then be stored in a DB2 database.

Complete reverse engineering tools are not

yet available. "There's no true reverse engineering tool. You can capture data and code from existing programs, but you can't pull out of running Cobol code what it's doing and why," said Peter Mimmo, an independent consultant in Marblehead, Mass. "You cannot capture the process."

Index Technology, Inc. in Cambridge, Mass., is trying to change that with XL/Recover, introduced in September. The company said the software captures both data and process information.

Another vendor vying for this market is Bachman Information Systems, Inc. in Burlington, Mass. It has released a product called the Bachman Analyst that will eventually address all of these areas.

Also coming in this area is Renaissance from Viasoft. It will extract the data, process and logic information from Cobol programs, save those rules in a repository and allow those rules to generate new code.

CASE vendor CGI Systems Inc. in Pearl River, N.Y., also has a reverse engineering tool in beta test. More CASE vendors are expected to enter the market soon.

JOHANNA AMBROSIO



Our Competitors' Vision
Of Enterprise-Wide
Computing Is Based
More On Their Interests
Than Yours.

Only One Company Is Enterprise-Wide



Building Truly Open, de Computing.

Introducing A New, More Cost-Effective Way Of Computing.

Other computer companies' vision of enterprise-wide computing usually entails you buying their products exclusively. And their products often have hidden hooks that lock you into buying decisions you might not otherwise make.

NCR's Open, Cooperative Computing is different. It's the first truly open blueprint for enterprise-wide computing. Designed to allow rapid assimilation of new technology through the use of standard hardware, software, and networking interfaces.

Since we released our strategy in February, we've received enthusiastic response from organizations of all sizes, in all fields of endeavor. Not being tied to proprietary architecture allows us now to introduce a suite of open systems hardware, software, and networking products based on the highest performance, lowest cost, most feature-rich technologies in the industry.

On the next few pages, you'll find a preview of our new products. A new family of scalable systems offering an unprecedented range of cost-effective power. And an intuitive software environment that, combined with new open networking products, can bring your enterprise together as never before.

Products designed to work with your current information systems, while providing a bridge to truly open, enterprise-wide computing.



The Most Cost-
To Reach New L



How To Build Truly Open, Enterprise-Wide Computing.

I am interested in finding out more about NCR's approach to building a truly open, enterprise-wide computing environment.

- Please have an NCR Sales Representative contact me.
- Please send NCR's "How To Build Truly Open, Enterprise-Wide Computing" brochure.
- Please send a brochure on the NCR System 3000.
- Please send a brochure on NCR Cooperation.
- Please send a brochure on NCR's Open Networking Environment.



Name _____

Title _____ Phone _____

Company/Organization _____

Address _____

City _____ State _____ Zip _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 3 DAYTON, OHIO

Postage will be paid by addressee

NCR Corporation
UNITED STATES GROUP
P.O. BOX 606
DAYTON, OHIO 45401

The Effective Way To Add Processing Power At All Levels Of Power.

Introducing The NCR System 3000 Family Of Scalable Processors.

Microprocessor technology has reduced the cost of processing as much as 100 times compared to conventional computing architectures. In the near future, that cost advantage will grow to more than 300 times.

The NCR System 3000 brings this step-change in technology to a complete family of scalable platforms, running open operating systems like UNIX®, OS/2 and MS-DOS. The System 3000 is designed to connect to your current systems environment, while providing a transition to the more cost-effective, flexible, open environment of the future.

From desktops and large servers to future massively parallel models offering more than 100,000 MIPS, our new System 3000 family will provide an unequaled range of performance. So you can add the power you need, when and where you need it.

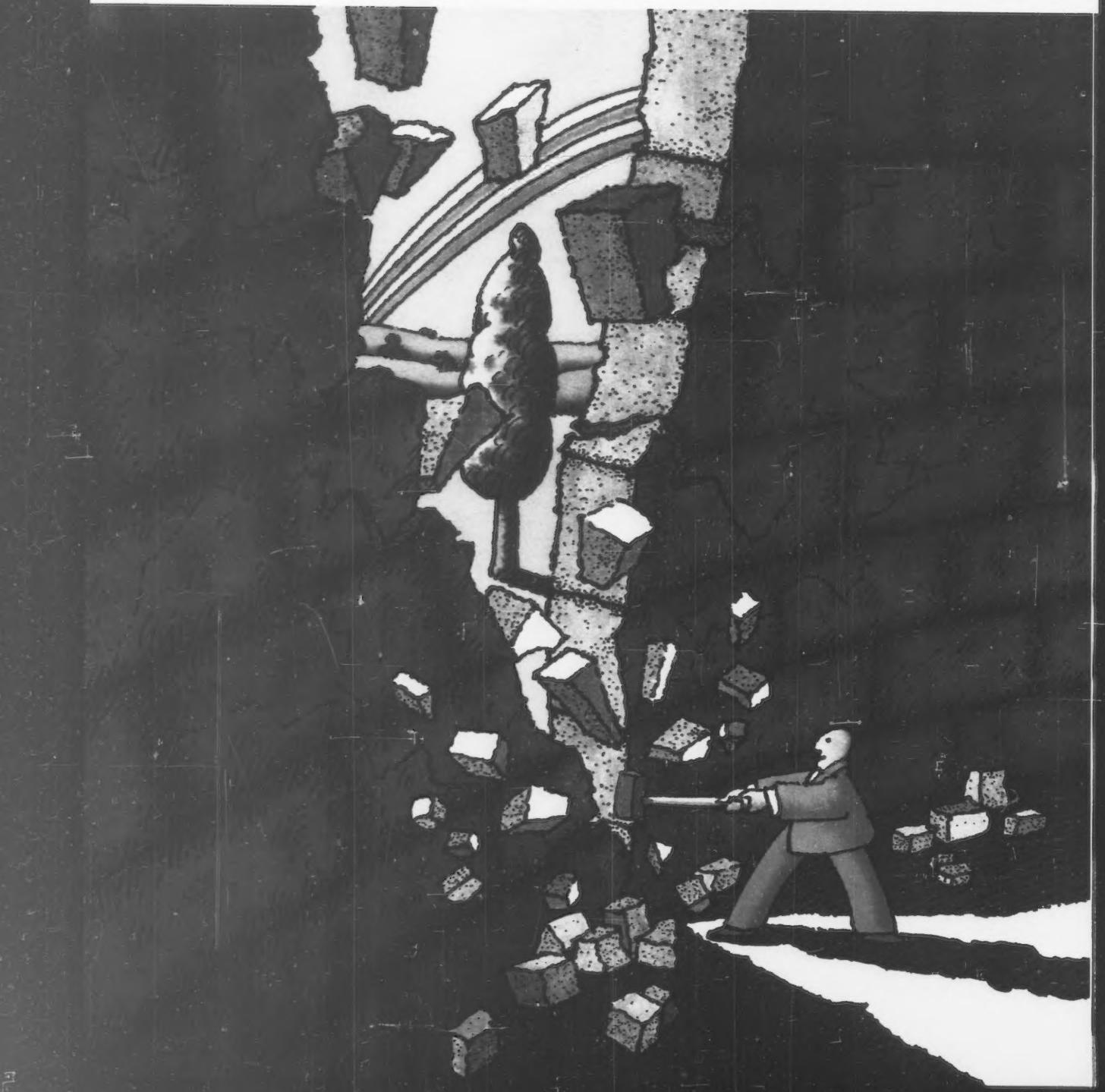
The NCR System 3000 takes advantage of the Intel® x86 chipset series—the most powerful microprocessors available—to provide you flexibility in design and integration, and an extensive set of existing applications, tools and peripherals. In fact, this new system will be among the first to use Intel's new 50MHz i486® microprocessor in a multiprocessing design.

The System 3000 offers total scalability of hardware *and* software, and complete object code compatibility, to give you access to an enormous application software suite. Three levels are now released for sale—offering performance from 7.5 to 320 MIPS. And support for the computing needs of one to hundreds of users.



The NCR 3000 lets you add processing power in cost-effective, incremental steps, rather than large, expensive ones.

Free Your Org The Limitations Of



ganization From Conventional Systems.

Introducing Cooperation.TM The Open Enterprise Integration Environment.

Conventional systems have spawned islands of information that separate departments and impede workflow more effectively than any wall.

The answer is NCR Cooperation. Software that integrates the general-purpose applications and platforms in your organization into one flexible, cooperative system with a consistent, intuitive graphic interface.

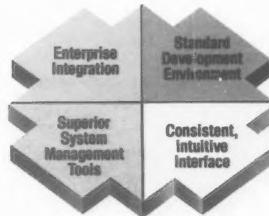
Cooperation benefits everyone in your organization. It lets MIS managers integrate multimachine, multivendor, multistandard environments, with the tools needed to create and manage a complete enterprise-wide network.

Its Business Information Monitor facilities allow executives to access the entire knowledge base of the enterprise from their own workstations.

And it aids software developers by speeding both new application development and the extension of conventional mainframe and mini-computer applications.

Cooperation allows access to your enterprise's resources from every desktop. It features powerful tools, including the latest in distributed *object* technology, that insulate both software developers and users from the complexities of the operating environment. Object-oriented programming lets developers reuse code, easing the job of building or modifying complex programs. And reducing the time and cost of development and training.

Cooperation can set your organization free from the rigid, hierarchical computer architectures of the past. Free from dependence on the vision of a single vendor. Free to meet the challenges of the future as you see fit.



Introducing The First Network Without Proprietary Roots.



NCR's new Open Networking Environment™ offers the first set of end-to-end networking products based on the Open Systems Interconnect (OSI) model.

Open Networking System™ (ONS)—an intelligent networking system—is designed to implement all seven layers of the OSI reference model to provide intelligent network application services and extensive internetworking capabilities.

It also interconnects varied LANs and WANs to help leverage your existing investment and save money by sharing communications resources. Its extensive SNA capabilities let you coexist with conventional networks while moving to an open environment.

ONS simultaneously bridges or routes:
OSI
TCP/IP
SNA
DECnet
NetWare IPX
X.25
NetBIOS
DEC LAT
X.25
AppleTalk
Ethernet
Token Ring
StarLAN
And more.

The Open Networking Environment also includes the powerful network management capabilities of NCRNet Manager. Also OSI-based, NCRNet Manager provides centralized management of both the internetworking environment and its attached systems.

The Network Without Wires.

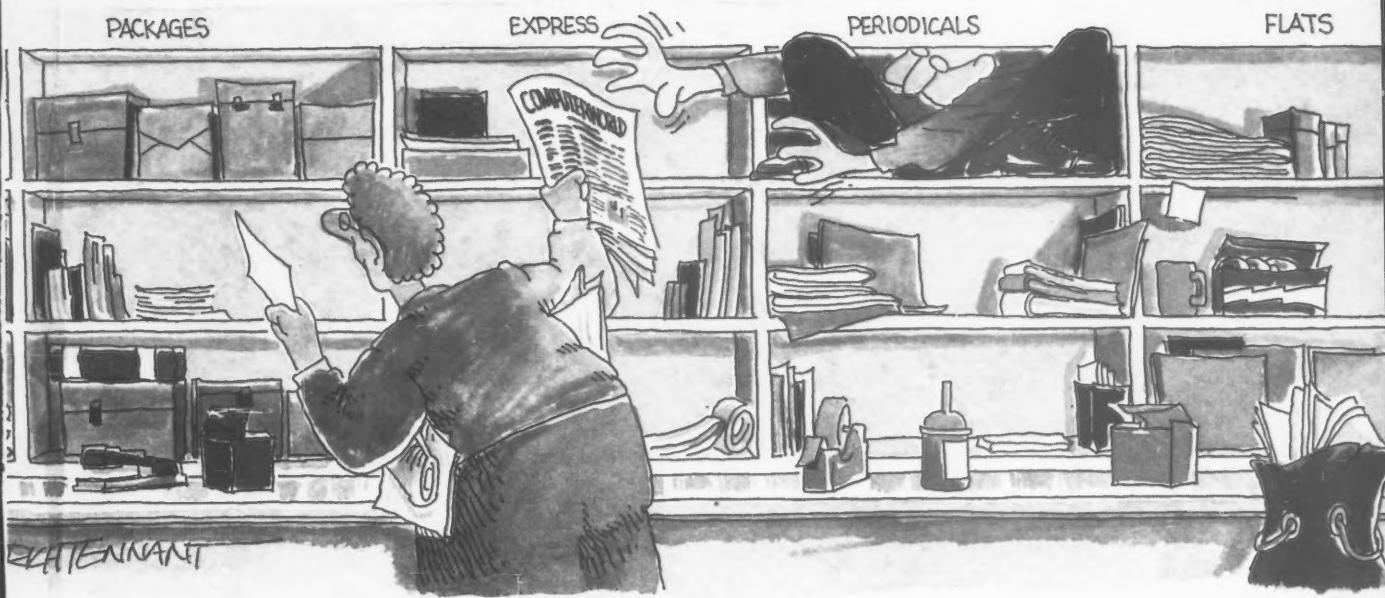
The new NCR WaveLAN uses radio waves to let you build an industry-standard LAN without wires. So you can put people and PCs wherever you need them. Without the time and cost of installing or moving a wired LAN.

For more information, phone 1-800-CALL NCR.

We'll help you grow truly open,
enterprise-wide computing.

NCR

**Open, Cooperative Computing.
The Strategy For Managing Change.**



There's no end to how far people will go to get COMPUTERWORLD first.

Staying on the cutting edge of the information industry sometimes calls for drastic measures — especially if your name is way down on your company's *Computerworld* routing list.

But there's really no need to put yourself in a compromising position.

Now you can be among the first in your company to get the most up-to-the-minute news on topics ranging from people and products to trends and technology to issues and information.

Simply order your own copy of *Computerworld* today and you'll receive 51 issues of the best-read publication in the computer industry. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the top companies using information systems technology.

Use the postage-paid subscription card bound into this issue to order your own copy.

And you'll no longer have to go to extremes to get to *Computerworld* first.



The Newsweekly of Information
Systems Management



Unleash the power of your workstation and your business is bound to feel the effects.

Lotus 1-2-3 for Sun



With Lotus[®] 1-2-3[®] on your Sun workstation, there's no telling how far your business can go.

Because it's designed specifically for the Sun workstation and the UNIX[®] operating system, 1-2-3 lets you take advantage of Sun's powerful environment.

Sun's networking makes sharing

information easy. Whether it's with an office next door or on the other side of the world.

And multi-tasking allows you to run many different 1-2-3 applications at once. All in different windows.

But the best part for you is that it's 1-2-3. We've kept the same familiar commands and keystrokes. And we've made it compatible with other versions

of 1-2-3. So moving your spreadsheet computing to your Sun workstation will give you a lot of satisfaction, not a lot of aggravation.

Call 1-800-842-8455 ext. 890 today, and find out how to take advantage of our limited time \$50.00 manufacturer's rebate. Why wait when the power to move your business is sitting right on top of your desk?

Lotus 1-2-3 for Sun



© 1990 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. SPARCware and the SPARCware design are trademarks of Sun Microsystems, Inc. UNIX is a registered trademark of AT&T.

PCs & WORKSTATIONS

COMMENTARY

Michael Fitzgerald

Channel interference



Busy reader,
please note: unless you currently use a Micro Channel Architecture (MCA, with all due deference to the film company, which has recently become touchy about this) or Extended Industry Standard Architecture (EISA) machine, what you are about to read really has no practical value for several years, so clip it and save it until then.

IBM makes for an easy target, and thus it naturally gets hit a lot. In fact, it's fairly easy to say that the big computer maker (or is that the maker of big computers?) is basically out of touch with what users want and generates sales largely because people and corporations are slow to change. Therefore, they continue to buy mainframes, and because they buy their mainframes from IBM, it's not much of a stretch to also buy IBM's personal computers, no matter how slow and overpriced.

Sometimes, it gets too easy to point fingers. Take this month's announcement of the Micro Channel Developers Association (MCDA), which has an executive committee consisting of IBM and 13 other companies. Now, it's easy to

Continued on page 48

I486 systems find right balance

ANALYSIS

BY RICHARD PASTORE
CW STAFF

Though observers initially feared that the Intel Corp. I486 chip might be too fast for the rest of the machine, today's 486-based personal computers appear to be both fleet and well-balanced, analysts said.

For the most part, vendors appear to be supplying users with PC components that are capable of keeping up with the central processor. Potential bottlenecks such as disk drives and display I/O have been tweaked with a variety of controllers and caching technology.

"Most designers have wrestled with the bottleneck problem and come up with different ways of solving it," said Paul Zagaeski, a PC analyst at the Yankee Group in Boston.

Users of 486 machines seem satisfied with the early power boost the boxes have given them and have not noticed component performance problems.

"We really don't seem to stress them hard enough to really see any degradation," said Arthur Block, vice-president of end-user automation support at Manufacturers Hanover Trust in New York. With 486s employed as network and application servers, Block said he is confident enough in their performance

benefits to consider purchasing several more for use as stand-alone workstations.

To secure a well-balanced 486 system, it is practically a given to employ a 32-bit I/O bus. "The people who are suffering are the ones who are putting a 486 on a 16-bit bus. You have a bog-down at that point," said Dave Kirkey, vice-president of sales at Advanced Logic Research, Inc., a vendor specializing in high-end boxes.

After the I/O path, the most obvious performance bugaboo is magnetic storage, which marks its responses in milliseconds while the CPU conducts its business in microseconds. This Gulf is not likely to disappear, but

vendors have taken steps to add CPU zip to at least some disk seeks.

"They are using techniques that have been used for 15 to 20 years in the mainframe business — caching," said James Porter, president of Disk/Trend, Inc. in Los Altos, Calif.

Disk caching is the most common speed-boosting technique employed in 486 PC storage. A small amount of semiconductor memory resident on a disk caching controller holds that data the controller predicts will be most often used. That data can be accessed in microseconds, because no disk rotation or drive arm positioning is involved.

Disk caching is an inexact science, however. Hit rates — the chance that the data the user needs will actually be in the

Continued on page 52

Intel 32-bit chip bids for laptop market

BY MAURA J. HARRINGTON
CW STAFF

BURLINGAME, Calif. — In a bid to corner the fastest growing sector of the personal computer market, Intel Corp. recently introduced the latest in its family of 32-bit microprocessor chips, the 80386 SL Microprocessor Superset.

Developed specifically for laptop and notebook-size PCs, the 386 SL and its peripheral counterpart, the 82360 SL, could increase the laptop life in laptop and notebook-size computers by as much as 50% while taking up 40% less space on the motherboard, claimed Mike Aymar,

vice-president and general manager of Intel's Santa Clara, Calif.,

Microcomputer Division.

The Intel chip set, according to Michael Slater, editor and publisher of "Microprocessor Report," provides an opportunity for computer manufacturers to produce a wide variety of notebook and laptop computers because of its power management capabilities and because there is extra room available on the motherboard to add peripherals.

Aymar said users will also benefit from the power management features built into the 386 SL chip.

For example, the chip set's system management mode in-

cludes a system management interrupt capability said to allow a user to simply shut the notebook or laptop PC in mid-task without losing any completed work.

While this capability is already available in small computers for applications running on 16-bit processors, the Intel 386 SL brings the technology to the 32-bit level, Aymar said.

According to industry analysts, there could be some notebook and laptop announcements incorporating the new chip set as early as this November, possibly at the Comdex/Fall '90 trade show.

Although Slater said Intel is the first vendor to his knowledge to formally introduce a 386-based, two-chip chip set for notebook-size computers, it is not the first to market a condensed PC chip set.

Santa Clara, Calif.-based Advanced Micro Devices, Inc. (AMD), a smaller rival of Intel, introduced its "PC-on-a-Chip" product two weeks before Intel's 386 SL Superset announcement. The product places the CPU and I/O peripheral devices for 80286-based computers on a single chip.

Full production of the Intel Superset 386 SL chip set is scheduled for the first quarter of 1991, the company said. The AMD AM286ZX is scheduled for production in volume by the second quarter of 1991, according to AMD.

Micro Focus Dialog System

The Human Interface Management System

MICRO FOCUS
A Better Way of Programming™

Micro Focus Dialog System™ is a high level tool that produces and runs user interfaces for COBOL applications. Whether your application runs under OS/2 or DOS, you can develop sophisticated interfaces for a variety of styles and emerging standards, without changing your COBOL programs. Dialog System is as versatile as your needs and imagination.

Dialog System is also the best development system available for graphical and character based user interfaces to front-end your mission critical business applications.

◆ A simple CALL interface is the link between your COBOL programs and Dialog System. Writing long, complicated user interface code in COBOL will become a thing of the past.

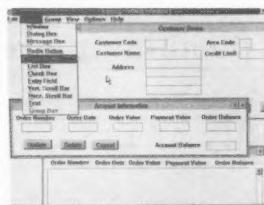
◆ Smaller, maintainable code will result from using Dialog System. The user interface is defined and run independently of the main COBOL program.

◆ Prototyping is simplified because you don't have to begin writing the data processing part of your application until after the interface is tried and tested.

◆ Testing support is provided in Micro Focus ANIMATOR™ as well as the Dialog System utilities Trap and Trace.

◆ Preserve your COBOL investment by using Dialog System to create the user interfaces you need and users want without learning new languages.

Bring the look and feel of the 90's to your applications with Micro Focus Dialog System.



The Early User Program version of Dialog System 2 gives easy access to Presentation Manager or SAA CUA objects.

For more information about Dialog System 1.1 or Early User Dialog System 2, call Micro Focus today at 1-800-872-6265 or 415-856-4161.

To see all its advantages,



NEC PowerMate 386/33E

Combining great power and speed with the enhanced compatibility of EISA architecture, the PowerMate® 386/33E is just what farsighted businesses need. For CAD/CAM. Financial modeling.

The PowerMate, DESKTOP, WORKSTATION, INDUSTRIAL COMPUTER, GRAPHICS CARD, AND DISPLAY, POWERMATE, NEC, and EISA are registered trademarks of NEC Corporation.

AT and PILOT are registered trademarks and OS/2 is a trademark of International Business Machines Corporation.

C&C
Computers and Communications

*Some restrictions may apply. Call 1-800-NECINFO to locate the authorized NEC dealer nearest you.

you'll need powerful specs.

CPU	Intel 386® microprocessor	—32-bit EISA bus interface
	33 MHz processing speed (zero wait states)	—33 MB/second burst rate
	8 MHz compatibility mode (1 wait state)	—scatter/gather transfer
	Optional Winex WTL 3167, or Intel 387 math coprocessor	—SCSI command queuing
	Calendar clock (with battery backup)	—auto configuration
MEMORY		—ESDI controller (optional)
	4 MB or 8 MB (80 ns) memory standard	NEC DISPLAY OPTIONS*
	Dedicated 32-bit high-speed Concurrent Memory Bus architecture (33 MHz)	—MultiSync 24
	Total high-speed memory expandable to 32 MB	—MultiSync 30
	64 KB (20 ns) SRAM cache	—MultiSync 40
INTERFACES		—MultiSync 50
	Parallel printer port	NEC GRAPHICS OPTIONS*
	Two RS-232C serial ports	—MultiSync™ Graphics Engine™
	PS/2® style mouse port	—intelligent 50 MHz TMS34010 processor
	PS/2-style keyboard port	—VGA compatible (640x480, 16 colors)
EXPANSION SLOTS		—Super VGA (800x600, 16 colors)
	One 32-bit full-size memory slot	—1024x768 (interlaced)
	Five 8/16/32-bit ISA/EISA full-size slots	—1024x768 (non-interlaced)
	One 8/16-bit full-size ISA slot	—256-color version available
	One 8/16-bit half-size ISA slot	DIMENSIONS
STORAGE SLOTS		Width: 21.2" (538 mm)
	Five 5 1/4" half-height	Depth: 17.7" (450 mm)
	Support for alternate two full-height 5 1/4" and one half-height configuration	Height: 6.3" (160 mm)
KEYBOARD		Weight: 51 lbs (23 kg)
	101-key mechanical keyboard	OPERATING ENVIRONMENTS
		Temperature: -50° to 95°F
		Relative humidity: 20% to 80% (non-condensing)
		Power supply: universal 115V/230V
		—auto sensing
		—325 watt maximum rated output

Multi-media. Presentation graphics. In short, for virtually any complex application requiring the ultimate in 386 computing, it's a perfect fit. For more details, call 1-800-NEC-INFO.

MS-DOS and Microsoft are registered trademarks and Windows 3.1 is a trademark of Microsoft Corporation. IBM and PC are trademarks of IBM Corporation.

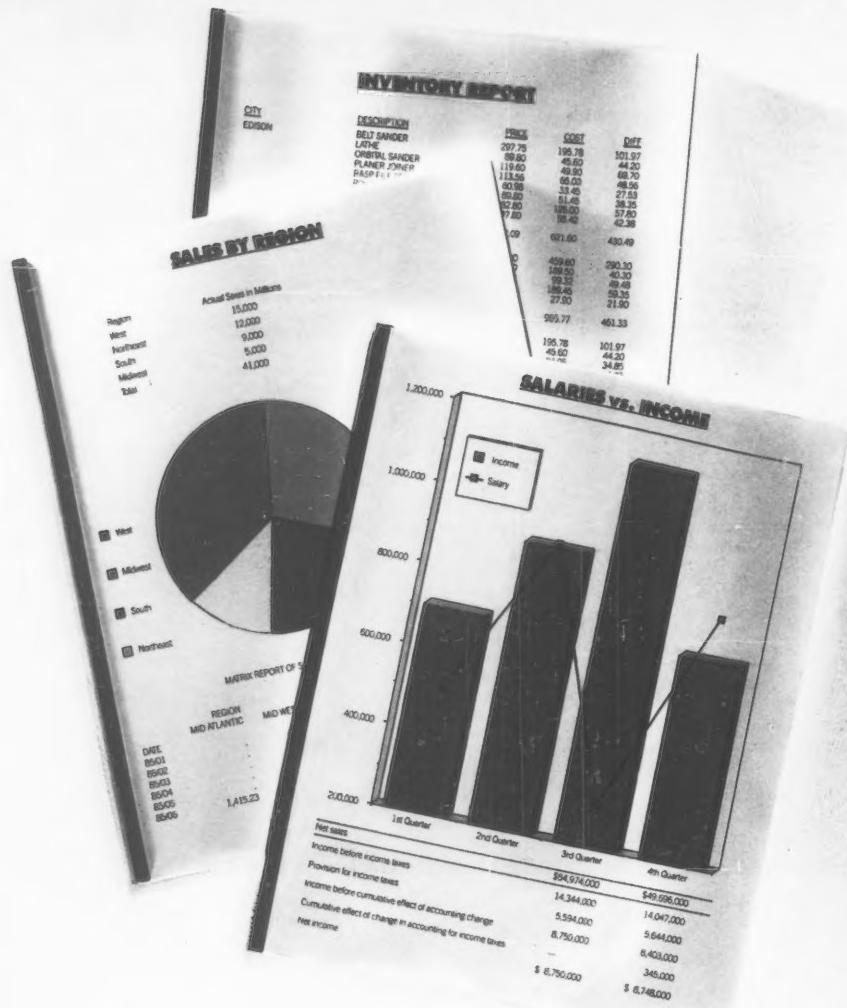
ESDI is a trademark of Seagate Computer. UNIX is a registered trademark of AT&T.

MultiSync is a registered trademark and Graphics Engine is a trademark of NEC Technologies, Inc. ©1990 NEC Technologies, Inc.

NEC

INTRODUCING FOCUS FOR TANDEM

THE LATEST REPORTS ARE GOOD NEWS FOR TANDEM USERS.



The good news is now you can link multiple NonStop SQL tables with Escribe files in a single report. And even convert and populate new tables from existing files.

Introducing FOCUS for TANDEM. The number one 4GL now works with Tandem computers, to provide you with the tools to build entire systems, using code generators, editors, screen and window painters, and security controls. You don't need to know SQL because FOCUS automatically generates the necessary syntax.

With FOCUS, you can also develop applications up to ten times faster than with COBOL, C and other 3GLs.

Your end users will be able to generate their own reports, graphs and queries from FOCUS' unique "point and click"

TableTalk™ facilities. Without having to learn the FOCUS language.

And, as with all versions of FOCUS, your applications are portable between Tandem and all other major platforms. Such as IBM, DEC VAX, UNIX, and PCs under DOS, OS/2 and LANS. Existing FOCUS applications can now be moved to Tandem systems unchanged.

For more information, call us at 1-800-969-INFO. Outside the U.S., call 1-212-736-4433. Or write to Information Builders, Inc., 1250 Broadway, New York, NY 10001. We'll be happy to give you the full report on FOCUS for TANDEM.



This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

Nantucket tackles Clipper bugs with fixes

BY PATRICIA KEEFE
CW STAFF

The release of the generally well-reviewed Clipper 5.0 from Nantucket Software, Inc. has not been without its problems. Some users have been tripped up by difficulties related to the install program, the Summer 87 version of Clipper and memory shortages. The company classifies these headaches as relatively minor but has taken steps to deal with them.

According to Larry Heimend-

inger, Nantucket's president and chief executive officer, an updated release of the Clipper 5.0 master disk will contain changes designed to provide more room to run programs. It will be provided free to current users when ready.

Users stymied by an installation problem with Clipper 5.0 generally have one of two problems: They are either trying to run it under DOS 4.01, or they do not have enough memory, Heimendinger said. However, at least one user running DOS 3.3

said he had great difficulty trying to install Clipper 5.0.

In any case, Heimendinger claimed that Clipper 5.0 is installing "100% OK in all cases." What is happening, he said, is that during the installation process, the utility program is not compiling correctly.

"It's a bug in DOS 4.01" that results in the creation of a larger-than-normal program when running the compile and link utilities, Heimendinger said. In response, Nantucket has changed "what has to come into memory in the install and compile portion" of the program so that some of it can be swapped out of memory. This fix is being tested and will be made available free of charge shortly, he said.

New users will be alerted

through a note in the package. "If they still have problems, we'll provide help for free," Heimendinger said.

Nantucket provides 30 days of free support, starting with the first call. The firm has also released a technical bulletin on the install problem that advises users what to do about it. It can be downloaded from Compuserve.

Clipper 5.0 users who still have Summer 87 installed can run into a conflict in the set parameter that sends the compiler to Summer 87 libraries instead of Clipper 5.0 libraries. Users will get an error message. A fix requires a simple change in the set parameter.

A third issue involves memory in general. Some users are finding that they exhaust the

swap space available under virtual memory management, Heimendinger said.

"It's not a bug. The system is performing exactly as it should. The problem is that virtual memory system needs a certain amount of RAM to maintain pointers to virtual memory space," Heimendinger explained. What is happening is that users, "through a number of different and very dynamic circumstances, are putting the squeeze on memory and so running out of the actual memory they need to continue."

"We're going to give users more head room on the [master disk]," Heimendinger said. Meanwhile, Nantucket has put out a second bulletin telling users what not to do.

Type-talking is a Gallaudet favorite

For the school's deaf students, E-mail and a PC network open new vistas

ON SITE

BY MAURA J. HARRINGTON
CW STAFF

WASHINGTON, D.C. — While most college students pick up the phone to call their friends to find out about this week's party or the latest gossip on campus, the students at Gallaudet University run not to the phone, but to the nearest networked personal computer.

Why? Because most of the students at Gallaudet are deaf.

Gallaudet University, chartered by Congress in 1864, is the only university in the U.S. completely devoted to educating the deaf. Though computers have been a part of the educational system at Gallaudet for several years, the use of computers as a learning tool for the deaf has increased dramatically in the past few years, according to Kevin Casey, director of Gallaudet's computer services department.

The computer system at Gallaudet consists of 1,000 IBM and compatible personal computers and 200 Apple Computer, Inc. Macintoshes, including SE and IICX models. The PCs are

networked together with both thick Ethernet and fiber-optic cabling on a Digital Equipment Corp. Decnet network. The Decnet implementation includes a Vaxcluster with two 8650s and two 11/785 VAXs. The most popular software running on the network is Wordperfect Version 5.1, said John Millikin, director of user services for Gallaudet's computer services department. But there are several other off-the-shelf packages in use, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s DBASE IV, that run off of the network server. Access to Macintosh-based applications is available through Macintosh-to-VAX third-party software, he said.

Some of the ways in which Gallaudet's computer services department has helped to ramp up use of its PCs is by creating a wide variety of training and educational programs that apply to

real-life work situations and that require the use of computers.

For example, the university uses closed-captioned videotaped training courses from Minneapolis-based Learn-PC, designed to provide deaf students with hands-on training, a Learn-



Gallaudet officials (from left) Millikin, Casey and Herbold run popular campus network

PC spokeswoman said. Otherwise, these students would be forced to watch a translator for instruction first and practice later, she said.

Another project going on at Gallaudet that prepares students for "real-life" work situations is

a Minitel USA, Inc. telecommunications system that incorporates video capabilities that allow deaf work-study students to make conference calls and establish ongoing links between students, faculty and the university's corporate sponsors participating in the work-study project.

The Gallaudet University Speech Training and Evaluation System, or GUSTES, is also a student speech training program that uses a specially designed NEC Technologies, Inc. PC-compatible computer that features a board said to allow acquisition and rapid conditioning of multiple voice signals and to provide an array of special sensors to interpret a deaf speaker's voice, according to an article written by Dr. James Mahshie, professor and director of the laboratory.

Unlike other voice interpretation devices, GUSTES uses signals obtained from a variety of sensors that can interpret the actual speech articulation of the voice and minute variations in air pressure that are associated with speech production.

While there are several innovative projects going on at Gallaudet, the most popular computer feature to date among the approximately 2,000 students at Gallaudet is electronic mail.

Mail call

More than 1,000 students log on to DEC's Vaxnotes every day, and many log on at least three times per day, sending three to five messages in each session, estimated Robert Herbold, assistant director of computer services. Vaxnotes, Bitnet and Internet are the most popular E-mail services available on the university's network, but users can also use any standard Transmission Control Protocol/Internet Protocol-compatible E-mail package as well, he said.

Because Internet and Bitnet, two nationwide university and research bulletin board services, provide access to networks located in other colleges throughout the world, students can also take classes at other universities that are not offered at Gallaudet.

Because of the increased popularity of PCs during the past two years, the computer services department has set up several computer centers across campus, locating some in the dormitories, he added. Students can remotely log in to the network, he said.



BT Tymnet Is Dialcom® Enhanced Messaging Services

BT Tymnet is: Global Network Services™ Network Management System, EDI-Net®, Electronic Transaction Services, LAN Connectivity Services and much more.

Dialcom® enhanced messaging services from BT Tymnet is the most sophisticated, comprehensive package of business communication and information services available today. Dialcom® provides global messaging to every major industrial nation in the world. Just call our toll-free number for complete details.

Contact BT Tymnet: 2560 North First Street
P.O. Box 49019 • San Jose, CA 95161-9019 • 800-872-7654

BT TYMNET

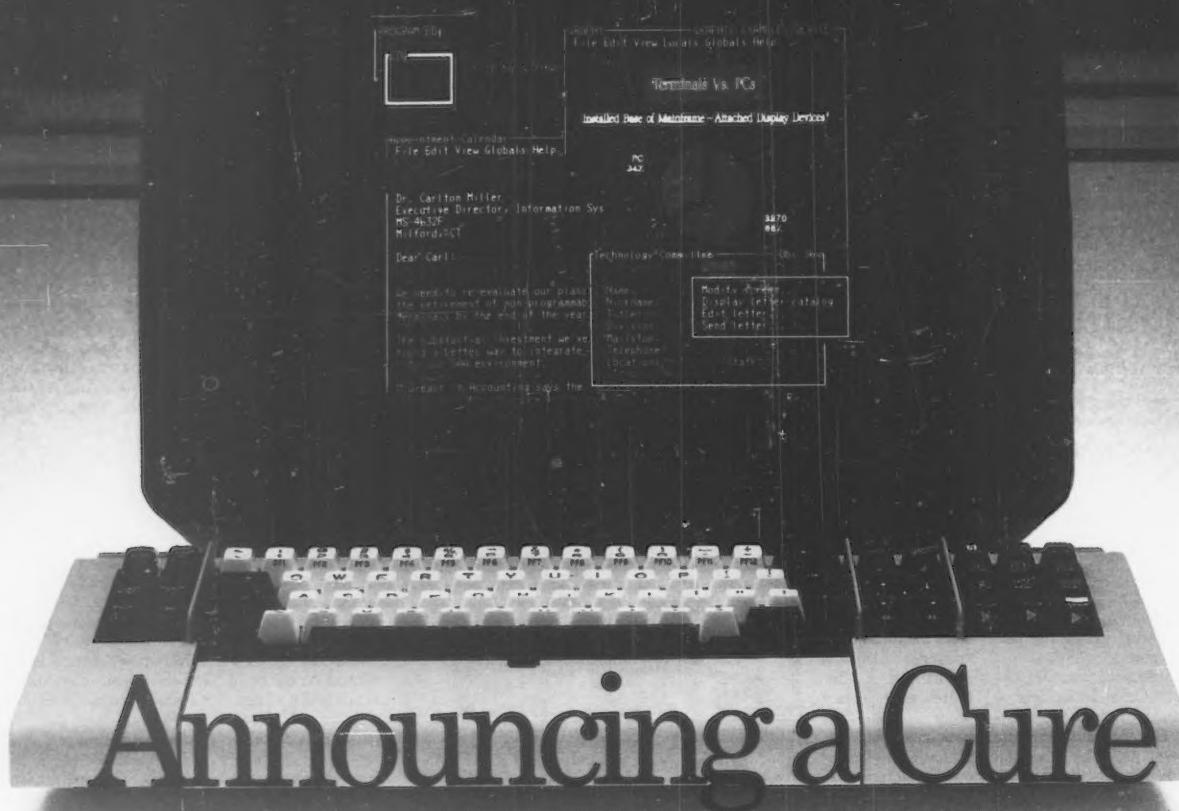
A British Telecom Company

Spirited.

Sold.

Strong.

Business Communications Around The World.



Announcing a Cure for the Terminal Blues

Now they're calling it a *non-programmable* terminal. Which might make you think technology has simply passed it by.

At SAS Institute, we see things a little differently. After all, your mainframe—and the thousands of terminals attached to it—are the backbone of your business. Not to mention your largest single investment in computing. And we just don't think you should have to replace that investment to enjoy the interactivity of a PC environment.

Just get the SAS® System of software.

Bring the Individual Productivity of a PC to Your Mainframe.

Only the world's leading applications system could bring the look and feel of SAA/CUA to your mainframe...and breathe new life into your 3270 terminals. Just point and shoot to gain *total* control over your strategic data-driven tasks: data access, management, analysis, and presentation.

Pull-down menus and pop-up windows make it more intuitive than ever to take advantage of the SAS System's wide range of applications—from report writing and graphics to decision support and applications development.

Let the SAS System point the way to greater productivity on *your* mainframe...on your minicomputers and UNIX®-based workstations...and on your PCs running OS/2® and MS-DOS®. Wherever you choose to run the SAS System, you'll get fast-and-friendly software backed by expert technical support, consulting services, documentation, and training.

All from SAS Institute Inc., one of the world's most respected names in software. For a SAS System executive summary, plus details about how you can receive the SAS System for a free trial, give us a call at 919-677-8200. In Canada, call 416-443-9811.



SAS Institute Inc.
Software Sales Department
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8200 □ Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc. UNIX is a registered trademark of AT&T. SAA and OS/2 are registered trademarks of IBM Corp. MS-DOS is a registered trademark of Microsoft Corp.

*Computer Intelligence, La Jolla, CA.

Copyright © 1990 by SAS Institute Inc. Printed in the USA.

Agilis stalls workstation, targets wireless LANs

BY JIM NASH
CW STAFF

Months after introducing its portable, wireless local-area network, Agilis Corp. is halting production of its workstations and fighting off a lawsuit launched by three ex-employees who developed Agilis' wireless technology.

Ken Biba, president of Mountain View, Calif.-based Agilis, said stiff competition in the portable market has forced the company to focus exclusively on its spread-spectrum radio LAN connections for portables. At his last count, said Gib Hoxie, an analyst at Arthur D. Little, Inc. in Los Angeles, there were 77 companies making portables.

About 300 of the Agilis workstations, mostly aimed at the high-end military and industrial markets, have been purchased to date, Biba said. About 80% of the workstations have the wireless connections, he said. The radio connections were developed by four men who joined Agilis in 1988 to further their spread-spectrum work.

Analyst Andrew Seybold at Dataquest, Inc. in San Jose, Calif., attributed the Agilis move to the large amount of capital required for portable computer production. He said the company has a better chance of making a name for itself early on in the wireless LAN connection market.

"The product was meeting a cool reception in the marketplace," Hoxie said. "It was too big, too heavy and too expensive. I thought they were off base technologically. The most interesting thing about their workstation was that it was wireless."

"Their workstation was a me-too product, and then it went wireless," Seybold said. Agilis' wireless connections form 230K bit/sec. bridges on any LAN running Ethernet. As many as 100 workstations can be hooked up using the connectors. Their range is 100 meters indoors and a kilometer outdoors.

MICRO BITS

AST wraps Bravo PC in upgrades

AST Research, Inc. is celebrating its 10th anniversary by bundling more than \$1,200 worth of free upgrades with its Bravo/386SX personal computer. Until Dec. 31, the promotion will include a 16-MHz 386SX system with a 5 1/4-in. floppy drive, 40M-byte hard drive, 2M bytes of memory, IBM Video Graphics Array adapter, AST-VGA color monitor, Microsoft Corp.'s Windows 3.0, DOS 3.3 and a Microsoft serial mouse with pad. Valued at \$3,900, the package costs \$2,795. According to AST, the Bravo/386SX itself normally retails for \$2,845.

In return for completing a market research questionnaire, Aldus Corp. will provide image-setter service bureaus and color prepress houses that service and support its products with a free copy of Aldus Preprint. The offer is good through Dec. 31. For more information about Aldus Preprint, call Aldus customer relations at (206) 628-2320.

Agilis' networks support all Ethernet-based systems, Biba said. The company began making wireless network connections 18 months ago, after it picked up a development team from Princeton, N.J., consultancy PA Technology. The team included PA Technology President Peter Cripps and executives Greg Nease, Mike Plotnick and Bill Frezza. They had been seeking funds to build a wireless LAN for Apple Computer, Inc.'s LocalTalk connector.

In joining Agilis, the team gave the technology's patent rights to Agilis and received a grant-back agreement allowing them to develop other, noncompeting

wireless network products in the future. Cripps, Plotnick and Frezza split off from Agilis in December 1989, Plotnick said, to form T/BD Associates in Princeton. Nease has remained with Agilis. T/BD is developing its own desktop wireless LAN products.

Shortly after joining the company, Plotnick said he thought wireless LAN connections would be the most profitable line for Agilis. Plotnick, who left Agilis in December to start his own spread-spectrum technology firm, filed suit against the company this summer in connection with a noncompetition agreement he signed with Agilis.

"The market wants a rugged workstation," but in a multiplicity of different designs rather than Agilis' standard modular architecture, Plotnick said. Police cars demand a more stationary workstation than "someone repairing a 747 or an Oldsmobile, who would carry it."

T/BD is avoiding head-to-head competition with Agilis by developing wireless desktop products, he explained, and by working with spread spectrum as well as low-power AM/FM broadcasts. The devices will be introduced during the next 12 to 18 months, Plotnick said.

The lawsuit was filed to cement his company's right to develop and market desktop wireless LAN connections, Plotnick said. Biba said he is "mystified" by T/BD's lawsuit.

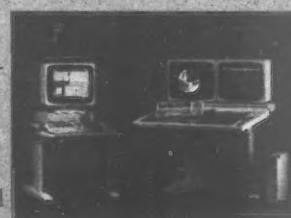


The SOLUTIONStation

Enter A World Of Integrated Applications
On A Full-Function, Full-Color, Entry-Level Workstation.

Available now: the Series 2000. An entry-level RISC workstation with high-resolution, 19-inch full color graphics. Easy-to-learn, icon-based user interface. Multivendor connectivity. Main memory of 16MB (expandable to 64MB). And a 200MB internal disk. An open UNIX platform that conforms to all industry standards. Ideal for meeting your needs in creating and managing technical information.

Available now: integrated Intergraph applications. We go beyond where our competitors stop - with industry-leading integration across the broadest portfolio of technical appli-



cations. Add to this, support for a full range of industry-standard third-party software. Providing over 900 technical applications available for immediate delivery.

Available now: worldwide solutions. As the #1 supplier of CAD/CAM/CAE in North America, Intergraph is a *Fortune 500* corporation supplying solutions worldwide for more than two decades. The Series 2000 is

being manufactured in the U.S. and Europe now for immediate availability. For more information and a demonstration, call 800-826-3515.

INTERGRAPH
Everywhere you look.



AT&T introduces a breakthrough

Now that AT&T ACCUNET® Switched Digital Services has 384 kbps, you can dial up full-motion video conferences whenever you want.

Look what just burst onto the switched digital scene: Video conferencing at 384 kbps.

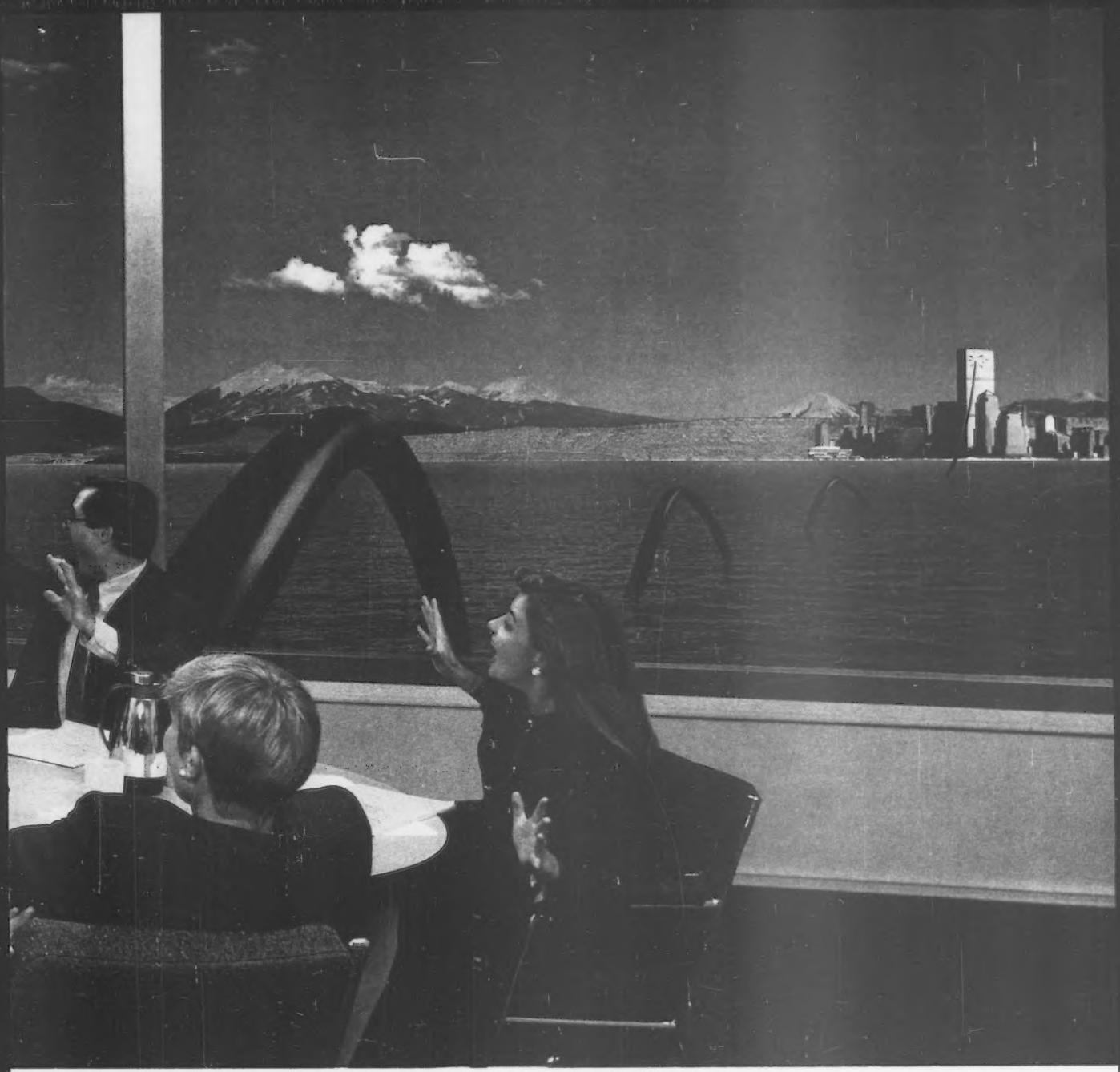
Now that AT&T offers 384 kbps through the public switched network (we're the only ones that do), you can dial up meetings with people outside your private network. And no matter where they are, you'll get such good picture quality, you'll be able to tell

how the people on camera like their coffee.

That's not the end of our good news, either. AT&T's new Switched 384 also gives you the capability to transmit bulk data up to six times faster than our competition. And for image transfer and CAD/CAM, SW384 means rapid response time and crisp, clean images.

Just like our Switched Digital Service at 56 and 64 kbps, SW384 offers you a unique, money-saving advantage; it lets you transmit data as often or as infrequently as you need to, without adding new locations to your private network.

And no matter which speed you choose with SDS, you're



in video conferencing.

transmitting over the only public switched network that's been designed, engineered and maintained exclusively for switched digital data transmissions.

So if your network doesn't always go as far and as fast as you'd like, give us a call. We can help you break into a whole new world of high-speed capabilities.

Innovation. Another AT&T advantage.

For more information on AT&T's ACCUNET Switched 384 Service, call your AT&T Account Executive or 1800 247-1212, Ext. 108.



AT&T

The right choice.

Fitzgerald

CONTINUED FROM PAGE 39

look at this conso...oops, almost said consortium. IBM is adamant that the MCDA is an association, not a consortium.

Anyway, it's easy to look at this group as a sign that IBM is admitting, after 3½ years of living in UK-like splendid isolation, that it's time to get some help before EISA vendors storm the Channel. Most analysts think that this effort by IBM will be too little, too late, even if IBM decides to loosen licensing requirements and share information about MCA products before it brings them to market.

Further, they point to the nature of

the group and note that almost half of the executive committee — Intel, Chips & Technologies, AOX, Core International, Western Digital and Cumulus — are chip makers, board makers and a hard drive vendor, who'll support anything that might make them money. The rest of the committee consists of three also-ran PC makers (Apricot, NCR and Olivetti), one company with an identity crisis (Siemens Nixdorf), a test lab (National Software Testing Lab), a company that doesn't even make MCA machines (NEC Technologies) and a company that almost no one has ever heard of (Reply Corp.). In other words, out of the supposed 800 vendors of MCA products, IBM has assembled a cast of self-serving opportunists, clowns and Europeans (and who here

cares how well MCA does in Europe, really?) to go into battle against the vendors that support the EISA standard.

Nonetheless, the timing of the group — indeed, its mere existence — may sway corporate purchases from EISA to Micro Channel.

EISA has been, essentially, marketing at its finest. While most analysts say that EISA has already established itself as an alternate standard to MCA, actual sales figures show that EISA is not making a splash in the market (189,000 machines worldwide this year, about 1/10th of total MCA sales), and projections indicate that the new architecture needs at least two years to begin to challenge MCA in the marketplace. So while EISA products do exist, the bus has yet to

establish itself in the market. That means EISA vendors are vulnerable right now, despite the marketing hype.

Marketing hype is key in this case, because the Gang of Nine, the EISA consortium, has based its attack on MCA around the incompatibility between MCA and the existing Industry Standard Architecture (ISA) that will dominate the installed base of personal computers until Armageddon or thereabouts. This incompatibility means that ISA boards won't run in MCA machines. As my college writing professor used to say after all my breathy sentences, "So what?"

Think about it: Just how likely is it that your average power-eating user with an expensive, brand-new, 32-bit, 1486-based, loaded-for-bear EISA machine will take a board from a chunky old 8-bit or 16-bit ISA machine and pop it into the power box?

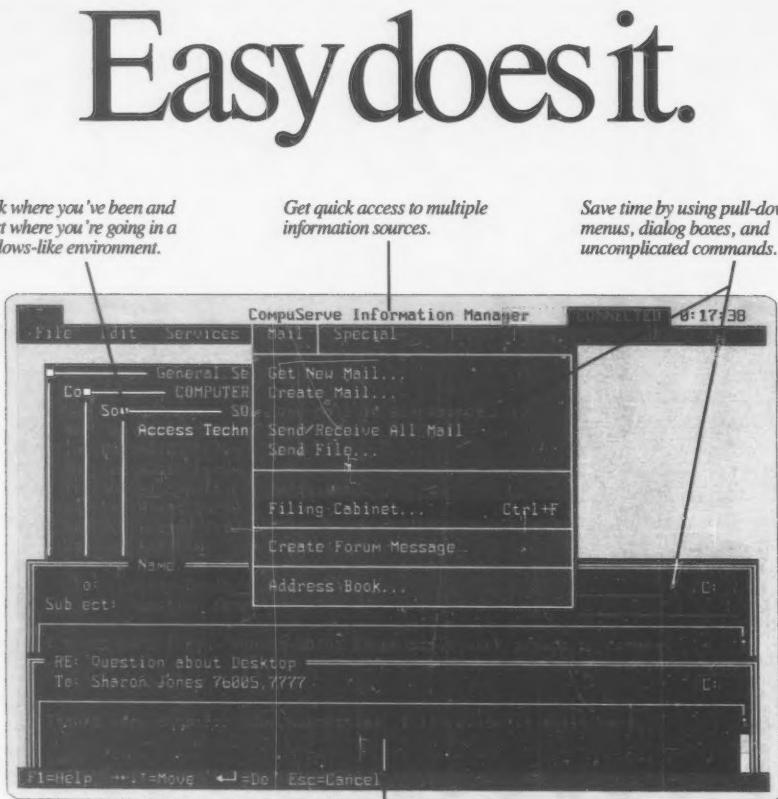
If card compatibility ain't marketing hype, may Madison Avenue sink beneath the surface of the earth.

The MCDA is (if IBM is smart) the first step in a marketing counterattack by IBM that will make buyers who are projected to replace their ISA machines with EISA machines think more than twice before they do so.

IBM is going to have to make it worthwhile for other vendors to join the MCDA and at least give the appearance of being influenced by what MCDA members have to say about MCA, or it runs the risk of having the acronym stand for Machines Containing Dumb Architecture. But if IBM plays its cards right, EISA vendors may start to play a different hand than they have been, one that might even include MCA.

For now, let's hope that the MCDA leads to some truly innovative boards for MCA, something that's lacking right now (not that EISA has them, either). Then, maybe users will start to care about the issue in the near future, rather than four or five years down the line. That would make the coming onslaught of marketing and countermarketing all worthwhile.

Fitzgerald is a *Computerworld* Midwest bureau correspondent.



Save time and money by working offline.

Welcome to the wonderful — and wonderfully easy — new world of CompuServe. Where you can now use the power of your MS-DOS personal computer, while taking advantage of all the online information and communications resources we have to offer.

CompuServe now features CompuServe Information Manager software, making us friendlier and more helpful than ever. Now, you can utilize a windowed PC interface with pull-down menus and dialog boxes. And

you can do more offline — composing letters or reading answers to PC support questions, for instance.

We're offering you this whole new world of CompuServe for only \$39.95* including software and a \$25.00 usage credit. Usage charges are as low as 10¢ a minute.

So let us show you how CompuServe can put you on easy street. If you're already a member, just type GO ORDER. If not, see your computer dealer, or call us today. **CompuServe**

800 848-8199

Requirements for MS-DOS version of CompuServe: Hayes compatible modem and 640K RAM. Hard drive recommended.
*Suggested retail price.

ALR weds CPU to Micro Channel

Advanced Logic Research, Inc. earlier this month melded its trademark upgradable CPU technology with IBM's Micro Channel Architecture (MCA) bus. Upgradable systems based on the Extended Industry Standard Architecture bus have been available from ALR and others for more than a year.

Users can upgrade the CPU of the MCA-equipped Modular Processor System from an Intel Corp. 33-MHz 80386 to a 25- or 33-MHz Intel 1486.

"This is a major advantage for customers that are planning for more local processing capability in the future but don't want to pay a premium today," said Aaron Goldberg, an analyst at International Data Corp. in Framingham, Mass.

The entry-level system with 386 processor, 1MB of memory and no hard disk sells for \$1,995. At the upper end, a 33-MHz 486-based unit with a 330-Mbyte hard disk costs \$7,595.



Now you can have high-speed data without taking on the whole pipe.

**AT&T's ACCUNET®
Spectrum of Digital Services
gives you the capacity and bandwidth
that fits your company's needs.**

Now you can upgrade your private network's capacity without carrying a full 24-channel load. Our ACCUNET Spectrum of Digital Services lets you expand at your own pace with only the number of channels you need. And no matter how small your particular piece of the pipe happens to be, ASDS gives you all the options you could want.

Choose from speeds of 96, 56, 64, 128, 256, 384, 512 or 768 kbps. Whether you need

capacity for voice, bulk data transport or SNA Polling, or bandwidth for special applications like image processing, video conferencing or CAD/CAM, ASDS can accommodate your needs. We've also got more locations than any comparable service. More than 500 in all.

When it comes to reliability, you can't do any better than AT&T. AT&T offers its customers the highest percentage of error-free seconds of any digital carrier.

And then there are the features that will appeal to your budget managers. Since we have more points of presence than anyone else, chances are you can take

advantage of lower access charges. And, of course, there's the whole point of going the ASDS route in the first place: you only pay for the capacity you need.

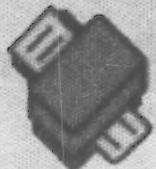
So if you need to add capacity to your network but you don't want to take on the whole pipe, give us a call. If we haven't already, we can probably take a load off your mind.

Value. Another AT&T advantage.

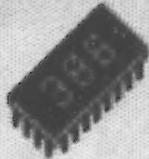
For more information about the ACCUNET Spectrum of Digital Services, call your AT&T Account Executive or 1800 247-1212, Ext. 107.

AT&T
The right choice.

Wind



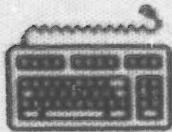
Printers



386 Enhanced



International



Keyboards

Now, all it takes is and you're

It's only fair to warn you that exposure to new Microsoft® Windows™ version 3.0 has been linked to obsessive and habitual usage. Why?

Because with a simple click of the mouse users can connect to the network, even access and manage network resources. All without cumbersome keyboard commands.

Which means users are now able to share data. Not frustration.

While in the interest of time, the Windows 3.0 graphical user interface

was designed to be easy to learn. And use. Neophytes, not to mention troglodytes, will be up and running in no time. With virtually no training.



Now, 286/386™ machines running MS-DOS® will no longer be limited to 640K. So there are no more impediments.

Users can even enjoy a network connection and at the very same time satisfy the cravings of multiple applications.

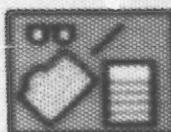
WS 3.0



Networks



Ports



Desktop



Fonts

a point and click hooked.

And since Windows 3.0 has a modular setup program, a single copy now memorizes every user configuration on the network. Which means, so to speak, one size fits all.

Furthermore, Windows 3.0 has redefined its relationship with IBM® 3270 emulation programs. Users can now download corporate data and easily share it with Windows applications. Something we have come to call peaceful coexistence.

One last point. Because Windows

3.0 has been optimized for machines with 1-2 megabytes of RAM, it will go a long way towards protecting your hardware investment.

Call (800) 323-3577, Department L21, for a backgrounder that outlines how Microsoft Windows 3.0 could benefit your corporation.

We're certain that you'll agree it's a habit well worth forming.

Microsoft

Making it all make sense

are registered trademarks and Making it all make sense and Windows are trademarks of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. 386 is a trademark of Intel Corporation.

1486

FROM PAGE 39

cache at any given time — vary widely. Caches work best when they can be optimized for very specific applications.

Unfortunately, most caches sold with off-the-shelf PCs are multipurpose caches, according to Porter. "That kind of cache you can't really optimize for a specific application," and consequently, the hit rate will not be as high, he said.

The most common cache controllers feature capacities of about 4K bytes, but larger

caches of 4M or 6M bytes are available. But these can be problematic, according to Kirkey. "You can run into various software compatibility issues when you start putting these esoteric controllers in there," he said.

A rarer strategy to boost disk access is the disk array. Only a handful of companies offer arrays on I486-based PCs, including Compaq Computer Corp. and Dell Computer Corp. With arrays, several drives are stacked and data is striped across the disks in set patterns. One or more of the drives act as a mirror backup to ensure data integrity and fault tolerance.

While arrays do speed access in some cases, access may sometimes actually be slowed, according to Porter. "Arrays won't necessarily speed up seeks; some have slower access than individual drives, depending on the application," Porter said. Also, it takes longer to stripe the data on an array than it does to write data to individual drives, he said.

Better seek times

With or without caches and arrays, hard disk drives in general have improved their average seek times considerably, making them better-suited partners for the I486 CPU.

"For a time, disks lagged behind processors," Zagaeski said. "Now, disks have caught up to processors" in their relative speed, he said.

Porter pointed out that a 20M-byte hard drive on an IBM PC AT once offered an average total access time of about 50 msec. Today, a 300M-byte drive on a I486-based PC can retrieve data at less than half that rate.

Displays have also been a potential bottleneck in I486 systems. However, designers have worked around it by using separate controller cards containing random-access memory or a separate video coprocessor.

Common in the Apple Computer, Inc. Macintosh line and now coming to the PC world, separate video coprocessors remove the heavy graphical data processing burden from the central processor. The video coprocessors help speed things up by handling all the complex calculations involved in displaying graphics.

Another option is separate memory for graphics. "Video RAM provides pages into which video data [such as pixel coordinates] can be temporarily stored so that the central processor can go off and do something else," Zagaeski said.

NEW PRODUCTS

Systems

Wyse Technology has announced a terminal that uses X Window System server code X.11 R4 and a 32-bit Motorola, Inc. 68020 microprocessor.

The WY-X5 is equipped with a 17-in. flat noninterlaced monochrome display. Features include 1,280- by 1,024-pixel resolution and a 70-Hz flicker-free refresh rate.

The product is priced at \$1,799.

Wyse Technology
3471 N. First St.
San Jose, Calif. 95134
(408) 473-1200

Visual Technology, Inc. has introduced the X-14/ES Display Station, a small footprint networked X graphic display terminal that complies with the X/Open Consortium Ltd.'s X11R4-X server specification.

The unit includes a Motorola, Inc. 68000 processor running at 12 MHz, 1M byte of standard random-access memory and a 14-in. landscape display with

1,024- by 800-pixel resolution. Pricing starts at \$995, and volume shipments are scheduled to begin next month.

Visual Technology
120 Flanders Road
Westboro, Mass. 01581
(508) 836-4400

Software applications packages

Integrated Software Design, Inc. has introduced a personal computer-based software package that integrates graphic design, information management and printing functions for in-house production of labels, forms and signs.

Barney Ellis enables users to prioritize, queue and batch jobs to achieve unattended printing, and up to four printers can be used for separate jobs, the vendor said.

The product is priced at \$1,695.

Integrated Software Design
171 Forbes Blvd.
Mansfield, Mass. 02048
(508) 339-4928

Designcad, Inc. has announced a microcomputer-based computer-aided design (CAD) program that describes geometric entities via a single, unified parametric representation.

Designcad Macintosh's single parametric representation serves as a cubic spline, and its extension serves as a bicubic surface. It enables users of Apple Computer, Inc.'s Macintosh to change mesh resolution without redrawing, the vendor said.

The product also provides two- and three-dimensional CAD capabilities and complete dimension/annotation capabilities.

Designcad Macintosh is priced at \$699.

Designcad
327 S. Mill St.
Pryor, Okla. 74361
(918) 825-4848

Business Forecast Systems, Inc. has released a product that can automatically forecast hundreds or thousands of items.

Forecast Pro Batch Version was designed to interface with corporate databases and production planning systems. Features include exception reports and a built-in forecast evaluation option that automatically withdraws data from the end of each series and checks the forecasts against actual values.

The product runs on IBM Personal Computer ATs, XTs, Personal System/2s or compatibles and is available at a special introductory price of \$1,995 until Jan. 1, 1991.

Business Forecast Systems
68 Leonard St.
Belmont, Mass. 02178
(617) 484-5050

Bradford Information Systems has announced an application designed to conserve fuel during an oil crisis.

The Interactive Distribution Planning System (IDPS) application enables users to create optimal truck routes from central distribution locations to customer delivery points.

The product runs on IBM Personal Computer ATs, XTs, Personal System/2s and IBM RISC System/6000 workstations that provide multiuser ac-

cess under Unix-based AIX operating systems.

It is priced from \$5,000 to \$7,500 and includes two days of installation and training.

Bradford Information Systems
2819 Foster Lane
Austin, Texas 78757
(512) 459-8999

Software utilities

Trend Micro Devices has introduced a laptop-to-desktop and desktop-to-desktop file transfer utility that features file transfer rates of 500K bit/sec. and includes an antivirus scanning system designed to detect and protect against viruses during file transfer operations.

Copy uses a virus scan program and a virus pattern bank to examine files before they are transferred. The product is available in 3½- and 5¼-in. formats and is priced at \$119.

Trend Micro Devices
2421 W. 205th St.
Torrance, Calif. 90501
(800) 228-5651

Blueridge Technologies, Inc. has announced a software package designed to convert an Apple Computer, Inc. Macintosh system and a scanner into a stand-alone document imaging system.

The Optix Desktop Imaging System enables users to scan paper documents into a Macintosh system and store them on an optical disc or magnetic disk. The system can do CCIT Group IV image compressions or decompressions in software instead of hardware, the vendor said.

The product runs on any Macintosh II machine and is priced at \$495.

Blueridge Technologies
P.O. Box 430
Flint Hill, Va. 22627
(703) 675-3015

Data storage

Priam Systems Corp. has announced a line of 200M-byte 3½-in. disk drives equipped with an adapter card for Intel Corp. 80286-, 80386- or I486-based IBM Personal Computer ATs and compatibles.

The ID200L series consists of the IDL200L-IC (\$1,551), ID200L-IF (\$1,531) and ID200L-I (\$1,500). Features include a 15 msec seek time and 50,000 hours of mean time between failures, according to the vendor. The drives are compatible with systems operating under DOS, Xenix, Unix or OS/2 and provide maximum bus speeds of 16 MHz.

Priam Systems
1140 Ringwood Court
San Jose, Calif. 95131
(408) 954-8680

Mountain Network Solutions, Inc. has announced a mini-cartridge tape subsystem that incorporates an integrated device electronics embedded IBM Personal Computer AT interface.

The Filesafe 8500 can accommodate up to 304M bytes in a 3½-in. half-height form factor while maintaining a data throughput rate of up to 10M byte/min., according to the vendor.

Evaluation units are scheduled to be available in January, and production quantities are slated to be released this March. The product has a retail price of \$895.

Mountain Network
240 Hacienda Ave.
Campbell, Calif. 95008
(408) 379-4300

Board-level devices

Pacific Data Products, Inc. has announced Pacific 4 Memory, an upgradable memory board that enables users to expand the memory of Hewlett-Packard Co.'s LaserJet printers.

The memory board can be used to expand the 512K-byte printer memory of the HP LaserJet IIP or LaserJet III devices by a range of 1M to 4M bytes. The product also enables users to print 300 dot/in. graphics and scanned images.

Pricing ranges from \$199 to \$499, depending on the amount of memory selected.

Pacific Data Products
9125 Rehco Road
San Diego, Calif. 92121
(619) 552-0880

Which leading company has developed the last branch automation systems you'll ever need to buy?

NETWORKING

COMMENTARY

Ellis Booker

Not a flash in the pan

Remember The Flash? He's recently made a comeback, starring in his own special-effects-jammed prime-time TV show. And how appropriate: The Flash, one of my favorite superheroes, is the ideal icon of the '90s, an age of quick-response, just-in-time instantaneousness.

Along with double cappuccino, what makes all this hyperactivity possible, of course, are computer and information technologies: on-line transaction processing, local-area networks, electronic mail and the ubiquitous facsimile machine.

Unfortunately, a new class of high-speed applications, particularly those calling for wide-area distributed networking and remote access to digitized images, threatens to outrace the nation's long-distance and local telephone networks.

Flash. Onto the scene bursts a public network technology you will hear much more about in the coming year or two: Switched Multigigabit Data Service (SMDS).

SMDS is a packet-switched networking specification for connecting LANs, host computers, image databases and so on over metropolitan areas. IEEE stan-

Continued on page 62

Who created these products to fit virtually any environment, be it UNIX- or MS-DOS-based?

Here's a hint: It's not IBM.

partner Diederich & Associates, developed Netview/PC applications to link Netview to a variety of non-Systems Network Architecture devices, including a radio communications network that controls trains through Tandem Computer, Inc. hosts, he added.

GE, an early user of the OS/2 version of Netview/PC, has found the interface more than adequate to support Netview monitoring of various telecommunications devices, according to Kevin Huff, a program manager who headed the Netview/PC implementation project.

On the other hand, IBM shops are likely to start looking at the LU6.2 link as they move toward more sophisticated network management applications that require program-to-program communications. GE initially de-

Continued on page 59

Netview options multiply

Netview/PC users take their time about moving to direct interfaces

BY ELISABETH HORWITT
CW STAFF

WHITE PLAINS, N.Y. — Now that IBM has finally provided users with not one, but two alternatives to Netview/PC, users are starting to think creatively about how best to implement Netview as a multivendor network management system.

IBM announced the long-awaited direct LU6.2 link to Netview last September. The vendor has also made it clear that it will support the Open Systems Interconnect Network Management Forum's specifications as a way for non-IBM

networking devices and network management systems to communicate with Netview.

Contrary to what analysts once predicted, however, the existence of direct links to Netview are unlikely to spell the demise of Netview/PC. IBM Vice-President Ellen Hancock emphasized during the announcement that the vendor will continue to support Netview/PC as a separate but equal alternative to the other interfaces.

More importantly, Netview/PC — in particular, the more powerful OS/2 version — has been finding its way into a significant number of user sites,

including Aetna Life and Casualty Co., Union Pacific Railroad and General Electric Corp. Automated Network Management, Inc., an IBM business partner that sells Netview/PC applications and development tools, reports approximately 20 installations.

Nor do present Netview/PC users express an urgent need to migrate to the more direct interfaces. "There is no particular advantage for us right now to migrate to LU6.2 or OSI," said Jim Montequin, a senior manager of data communications at Union Pacific Railroad. The railroad, with the help of IBM business

NSF opens up digital doors to scientific data

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — One million Internet users in 35 countries now have on-line access to information about research programs funded by the National Science Foundation (NSF).

The NSF is joining the U.S. Department of Energy, the National Aeronautics and Space Administration, the National Institutes of Health and other agencies in a move to make information about federally funded research available free to the

public via electronic bulletin boards and databases.

Officials at the NSF said the data will be used by individual researchers, the offices of NSF-sponsored research, science policy analysts and the press.

NSF's Science and Technology Information System (STIS) can be accessed by dial-up connection or by remote log-in via Internet, the umbrella network of networks used mostly by the research and academic communities. STIS contains the full text of the latest two "NSF Bulletins" — the monthly publication announcing new programs,

deadlines for upcoming grant awards, publications, meetings and sources for more detailed information. It also contains press releases and lists of publications and films and will soon contain a database of descriptions of 15,000 to 18,000 active NSF-awarded research projects.

Users may interactively search text of documents by keyword, topic or by Boolean expression, displaying results on-line or downloading documents to a local device. Internet users get files from NSF using the File Transfer Protocol.

Ruta Godwin, project leader in NSF's Office of Information Systems, said that until now, information about NSF programs

and grants was available by calling the foundation's office of public affairs or through the Dialog commercial on-line service. The information is now available faster, more conveniently and at no cost other than a possible long-distance telephone charge, she said.

Godwin also said information is now more easily obtainable by those with a limited knowledge of what they are seeking. The retrieval software, Verity, Inc.'s Topic, uses a concept-based retrieval method that automatically relates topics and subtopics. For example, Godwin said, a user specifying an interest in "materials science" would also retrieve information

Continued on page 59



Remember The Flash? He's recently made a comeback, starring in his own special-effects-jammed prime-time TV show. And how appropriate: The Flash, one of my favorite superheroes, is the ideal icon of the '90s, an age of quick-response, just-in-time instantaneousness.

Along with double cappuccino, what makes all this hyperactivity possible, of course, are computer and information technologies: on-line transaction processing, local-area networks, electronic mail and the ubiquitous facsimile machine.

Unfortunately, a new class of high-speed applications, particularly those calling for wide-area distributed networking and remote access to digitized images, threatens to outrace the nation's long-distance and local telephone networks.

Flash. Onto the scene bursts a public network technology you will hear much more about in the coming year or two: Switched Multigigabit Data Service (SMDS).

SMDS is a packet-switched networking specification for connecting LANs, host computers, image databases and so on over metropolitan areas. IEEE stan-

Continued on page 62

SNA gateways survive adolescence

BY JOANIE M. WEXLER
CW STAFF

They've come a long way, baby.

According to test results in a recent report by J2 Software Labs, Inc. in Santa Cruz, Calif., Systems Network Architecture (SNA) gateways are increasingly feature-rich and reliable, making life in the micro-to-mainframe environment much less painful than in days of yore.

"When SNA gateways came out five years ago, there were concerns about sessions staying active, file transfer failures and communications checks," explained John Siegel, president of J2 Software and author of the report. "The products have really matured in the last couple of years."

SNA is IBM's suite of networking protocols that allows communications between IBM devices and between IBM and non-IBM devices. A hardware adapter inside each desktop computer or a stand-alone gate-

way is necessary to convert the protocols in the small systems to SNA so they can communicate with the SNA-speaking mainframes.

J2 Software, which evaluated nine SNA MS-DOS-based gateway products during a period of approximately one year (see chart), cited the stand-alone approach as generally the most economical for serving multiple desktops. However, companies using this approach for local-area networks must balance trade-offs in performance — because of data-traffic bottlenecks accumulating in the single device — with the overhead added to the mainframe by direct connections, according to Siegel.

J2 Software's gateway study used an unweighted rating system that resulted in only a 10-point differential between the highest and lowest rated vendors. Out of a possible 81 points, the highest rating of 57 was shared by Attachmate Corp. and Data Interface Systems Corp.

The lowest rating (47) was given to 3Com Corp.

Siegel pointed out, though, that most companies would weigh certain categories more

heavily than others (J2 Software treated all criteria as equal), rendering certain products more applicable to different environments.

The study provides a ratings worksheet, which an organization can use to fine-tune J2 Soft-

ware's assessment to suit its own needs.

Siegel added that the study will probably be updated later this year to rank the Microsoft Corp. Windows support now offered by many vendors in their SNA gateway products.

Golden gates

SNA gateways from Attachmate and Digital Interface Systems tallied the highest raw scores in product comparison

J2 product ratings by category	SNA gateways from Attachmate and Digital Interface Systems tallied the highest raw scores in product comparison									
	3Com Corp. Maxxess SNA GW	Attachmate Corp. Extra! 3270 GW	Data Interface Systems Interface D1 3270 LAN/GW	Digital Communications Irma LAN/GW	Eaton Technology Corp. Access GW	IBM Personal Comm 3270 Network Software Associates, Inc. Adaptec SNA GW	Novell Inc. Netware 3270 Corp. Rabbitsoft Software	Rabbitsoft GW		
Comprehensiveness	2	7	8	7	3	8	4	8	8	8
Pricing	6	2	9	5	7	1	8	7	7	7
Gateway-to-host access features	7	8	8	4	4	5	4	3	6	
Manageability and security	7	7	7	8	4	6	6	4	3	
Terminal emulation	3	7	6	8	6	8	4	6	6	
Printer support	7	6	3	7	8	7	7	5	8	
API support	5	5	5	6	7	8	7	8	6	
Memory usage and file transfer speed	4	8	5	5	5	5	3	7	5	
Ease of use	6	7	6	5	4	5	6	4	7	
UNWEIGHTED TOTAL	47	57	57	55	48	53	49	53	56	

Rating system: 1-Unacceptable 5-Average 9-Excellent

Source: J2 Software Labs, Inc.

CW Chart: Doreen St. John

Low-cost Macs gain network access

BY JAMES DALY
CW STAFF

While the low price tag of Apple Computer, Inc.'s Macintosh Classic was the star of last week's product introductions, the networking abilities of the newly released Macintosh IIISI may go a long way in helping realize an even more important company objective: cracking the corporate market.

With the \$1, Apple now has a machine costing only \$3,769 that can be easily tied into sophisticated corporate networks. The key to the equation is tucked deep inside the SI with the Nubus expansion slot, an op-

tion previously only available on more expensive Macintoshes.

The slot allows users to install the \$249 Nubus adapter card, a sophisticated device that supports multiple processors and expands the SI's ability to tap into large communications networks. The Macintosh IIISI also includes a slot to install the 030 Direct Slot card, which also beefs up the system's networking options.

Analysts said the move builds on Apple's strategy to integrate sophisticated communications abilities into its lower-priced machines. "Apple has made tremendous strides in positioning the Macintosh, which once was

perceived as a stand-alone device, as a workstation that offers a high level of connectivity," said Lee Doyle, an analyst at International Data Corp. (IDC) in Framingham, Mass.

Networking capabilities have become more important to Apple as the number of Macintoshes linked into networks has skyrocketed, product manager Brodie Keast said. IDC estimated that nearly half of all Macintoshes are networked, and 1.2 million Appletalk nodes will be installed worldwide by 1993.

Apple has moved to take advantage of this dynamic. Last year, Apple introduced 17 networking and communications products, and this spring, the Cupertino, Calif.-based firm made good on a longstanding promise to provide connectivity tools to hook Macintoshes into the Digital Equipment Corp. VAX environment.

The company, however, had been slow out of the gate to provide connectivity products, and third-party developers quickly gobbled up a good part of the market share.

However, Apple said it is committed to correcting former mistakes, specifically toward providing more competitive Ethernet connectivity options. With third-party developers undercutting Apple's \$699 Ethernet card by a wide margin, Apple scientists are reportedly working on a new low-cost Ethernet product. Apple is also reportedly developing a line of lower-cost Ethernet adapters for the Macintosh that could sell for less than \$300.

Novell manager warns of problems by phone

BY JIM NASH
CW STAFF

Novell, Inc. is giving network monitors a voice through its Lantern Services Manager. The software, currently being beta-tested and scheduled for shipment in January, promises to call information systems managers when statistical thresholds are exceeded on a network.

"This is interesting," said Tom Thibault of Thibault Associates, Inc. "You can sit this on a network, hook up a modem on it, and it will dial up the administrator" to warn of problems, he said. Thibault Associates is a network management services company in Walnut Creek, Calif.

While he has yet to see the Services Manager application, Greg Scott, computing services manager at Oregon State University's school of business, said he has been impressed with Novell's Lantern monitors.

"Lantern really does a better job pulling apart packets to see what the problem is," Scott said. Services Manager would need to do a better job isolating failures than the Hewlett-Packard Co. LAN Probe it uses to monitor his systems, he said. "I want to be able to tell in feet where a cable failure is, for example," he said.

Jeff Turner, product manager at Novell, Inc.'s San Jose, Calif., office, said Services Manager software continuously monitors and logs the activity recorded by

all Lantern devices on multiple local-area networks. Turner said that a modem-equipped Services Manager personal computer will automatically dial up Lantern stations if a cable failure occurs between machines.

The Lantern can monitor any device running any protocol on an Ethernet network, he said. While Lantern uses Simple Network Management Protocol (SNMP) to communicate with Services Manager, no SNMP agent is needed on the monitored machines, Turner added.

"What they've found here is their niche," Thibault said of Novell's Lanalyzer LAN analysis unit. "This is aimed at users who want something that does what the Lanalyzer and [Network General Corp.'s] Sniffer will do for a multiple-LAN environment, but with a limited IS staff."

Thibault also said a service firm such as his might use the device remotely to track events on a client's LAN. By setting the warning thresholds low enough, he said, it would be possible to get an alert from Services Manager before the user knew a problem was building.

Lantern Services Manager runs on Intel Corp. 80386- and i486-based PCs running Microsoft Corp.'s Windows Version 3.0 and will be priced at \$4,995. The application does not require Novell's Netware. Lantern monitors began shipping in May, Novell said, and cost \$4,495.

It's ISC-Bunker Ramo,

Introducing Primate Plus and
The Power Banking branch automation
systems. And we want to show you how
ISC-Bunker Ramo is revolutionizing
branch automation so much we're willing
to go head-to-head in a test with IBM,
NCR or any of the other guys. And if we
don't outperform them, we guarantee
your money back. Any questions?

Call Ron Mason 509/927-5600.

"Every new construction site, no matter how remote, can become part of our network. All we do is set up a PC and dial in."

"Only BANYAN could have done it."



From an interview with John Good
of The Turner Corporation.

"Our New York headquarters is connected to most of our U.S. offices by VINES® with our job sites on VINES PC Dial-in.

"This allows us corporate-wide access to critical information such as cost control, job progress, and subcontractor monitoring on all current projects. And when someone accesses information, it's up to the minute because of local updating."

How has VINES changed your business?

"Five years ago, everything was on an IBM mainframe. Now the only thing left on it is Human Resources, Benefits, and Payroll. All of our strategic applications reside on VINES. And by the end of first quarter 1991, we'll be off the mainframe entirely."

How did you learn about Banyan?

"I was researching a network at a reference account in Washington. But it lacked many of the features I felt we needed. I mentioned this to their network administrator. He sighed, and said, "These are the people you should talk to. I wish we had." Then he went to his desk and got me a Banyan brochure."

Banyan's VINES network operating software offers unmatched flexibility to accommodate your unique business needs. For a further description of The Turner Corporation's networking challenges and solutions, write or call us at 800-828-2404 (in MA 508-836-2828).



Networking. Without limits.

IBM And Unisys Users Finally Have Something In Common.

Now Unisys 1100 and 2200 users can take advantage of advanced solid state disk technology that was once only available to the IBM world. EMC, the leading solid state disk manufacturer for the IBM mainframe market, brings the unique technology of its ORION Solid State Disk Series to Unisys 1100 and 2200 systems.

ORION lets you access your critical files faster than ever before. With absolute data integrity. And functionality that was never before available for the 1100/2200 Series. All for a price that brings solid state storage within your reach.

Unmatched I/O performance.

ORION provides data transfer rates of up to 4.5 megabytes

per second, and an access time of 0.1 milliseconds. It eliminates I/O bottlenecks for greater system utilization and maximum user productivity.

Guaranteed data availability and integrity.

ORION's own battery back-up unit and DataSave hard disk option combine to protect your data in the event of a power failure.

Reliability you can count on.

ORION's semiconductor design ensures the highest reliability for your critical applications. Advanced fault isolation and detection and EMC's stringent test procedures have earned ORION the highest reliability ratings. And EMC backs that

1100/90

IBM

The ORION Solid State Disk Series. Proven in over 500 IBM installations. Now available for Unisys 1100/2200 systems.

claim by providing you with comprehensive maintenance and support programs.

CPU flexibility.

Only ORION can operate with both Unisys 1100/2200 and IBM and IBM PCM computers. So you can transfer an ORION to where you need performance the most. And ORION Series subsystems are easily configured to your exact performance requirements. No other solid state disk brings you this level of flexibility.

Compact and energy efficient.

ORION provides the highest capacity per square foot of any solid state disk on the market. It saves space—plus cuts power and air conditioning requirements.

It's the total cost-effective storage solution.

Uncommonly affordable.

If you are considering solid state storage, first find out what proven ORION Solid State Disk technology can do for your Unisys system—and your bottom line.

Call EMC today at 1-800-222-EMC2. MA residents call 1-508-435-1000. In Canada call 1-800-543-4782. Ask for extension UO2C.

EMC, ORION and ORION/VL are trademarks of EMC Corporation. Unisys and Unisys 1100 and 2200 are trademarks of Unisys Corporation.

EMC²

Boston users batten hatches for Big Dig

Redundant communications links are order of the day as eight-year highway project looms

BY SALLY CUSACK
CW STAFF

BOSTON — In 1998, Boston will (it hopes) have completed its multibillion-dollar central artery project. Plans call for 128 miles of highway to run across the city's congested downtown business district and its thick tangle of communication cables.

But just what will happen to telecommunications during the eight-year construction project termed "The Big Dig" by locals?

Jim Allen, vice-president of communications at the Federal Reserve Bank of Boston, said his biggest concern will be driving to work across the construction. "We've taken care of the communications lines," he said confidently.

The Federal Reserve currently has four redundant lines of fiber-optic cable and two different carriers responsible for maintaining uptime during construction.

"No single construction accident will

WITH MORE than 17 million calls every day that cross the path of the artery, the carriers have been working round-the-clock for the past several years to insure that lines will be operational.

take out all of our facilities," Allen said, noting that the bank started working with both New England Telephone (NET) and Metropolitan Fiber Systems/McCourt, Inc. early in 1989, and the work was completed by the end of the year.

The Federal Reserve has been using one fiber line from NET since 1987, and the diversity offered with the automatic switching was basically an enhancement, Allen said. The bank will use the MFS/McCourt network for incoming 800 services and for accessing its long-distance carrier in mid-December. MFS/McCourt is providing two paths for communications to and from the Federal Reserve, with network routes entering the building at separate points and housed in separate conduits.

With more than 17 million calls every day that cross the path of the artery, the carriers have been working round-the-clock for the past several years to ensure that lines will be operational during the massive construction project.

According to John Johnson, a spokesman for NET, the local Nynex carrier, the company has divided the area into two parts in order to reroute the facilities. The first area concentrates on the inter-office circuits responsible for switching offices in the downtown area, he said, indicating that there are literally hundreds of cables intersecting the artery in this area. The other portion consists of the local loop piece of the network, which connects a user with the telephone switching office.

"The local loop portion cannot be moved," Johnson said. "There are 39

conflict locations across the artery construction."

To circumvent this potentially disastrous situation, NET has constructed utility corridors — conduits located in underground infrastructures that house the cables away from construction activities. The company will switch the local loop from the security of these conduits before construction begins, Johnson said, adding that NET has a backup fiber loop in addition to the alternative loop structure.

According to Massachusetts Depart-

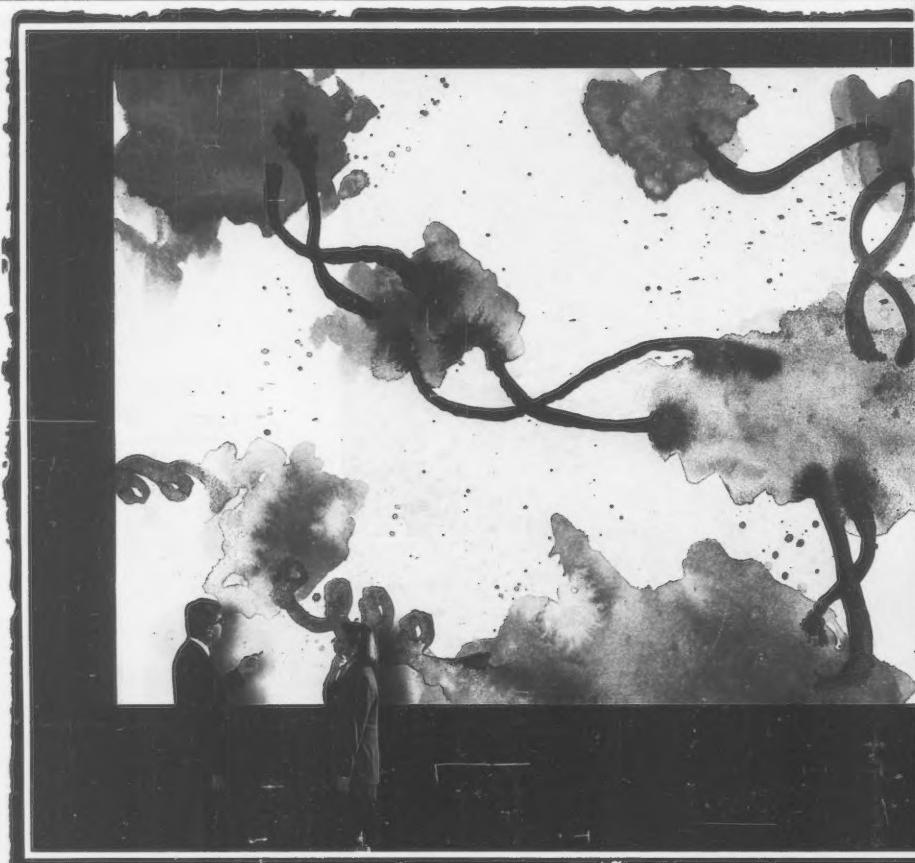
ment of Public Works director Robert Albee, the pencil-thin fiber-optic technology allows for the elimination of "a lot of unnecessary cable. We're working with almost 100 years worth of utility companies' infrastructure here, and none of it is state of the art."

Not everyone is as optimistic as Allen or Albee. Debra Villani, systems manager at Hemenway & Barnes, a large legal firm, said, "We're right on State Street, overlooking the artery. If they cut a cable, the whole area could be out."

Villani noted that the law firm is not totally dependent on the telephones to conduct business, and "if we had to do without them for a couple of days, there are alternatives."

She added that she would like to see a more detailed explanation of the error margin from the state Department of Public Works.

According to Shelly Karp, operations analyst at the New England Medical Center, the hospital is watching the situation and has several auxiliary backup systems and uninterruptible power supply devices to carry it through a potential power cut. The 400-bed facility depends on several different computer vendors to supply its systems, including IBM, Digital Equipment Corp. and Data General Corp.



"That reminds me, now that we've managed to network everything, who's going to manage our network?"

Deciding on how to manage a network with different devices, systems and architectures can be an abstract proposition for any company.

Consider then, for a moment, this bold statement:

No other company helps companies design, set up and manage their multivendor networks better than IBM.

Surprised?

Then ponder this as well. IBM's

NetView® family of network management software is unsurpassed in helping you better control, monitor and automate the flow of information in your company.

Graphically, all from one point. 24 hours a day.

Whether your equipment is IBM or not.

NetView manages OSI systems and handles your voice and data applications. What's more, NetView has been

NetView is a registered trademark of International Business Machines Corporation. Copyright 1990 IBM Corporation

Netview

CONTINUED FROM PAGE 53

cided not to implement a two-way "command-response" connection on Netview/PC, primarily because "it would be too big a programming investment," Huff said.

"Now, if LU6.2 reduced costs and made it easier to do this," and if the right vendors supported it, "we would be very interested," he said.

CSX has "already automated a significant portion of our operations" using Netview applications, said Doug Underhill, the railway carrier's assistant vice-president of technical services. LU6.2 would provide a way to extend those automation

operations by allowing distributed automation system managers to communicate with one another, he said.

Underhill said that he also liked the fact that a Netview program can ask a device to explain an unfamiliar message over the LU6.2 link. In contrast, Netview/PC requires "having to stop everything while you explain to Netview what a new modem status code means," he added. "Periodic interruptions go against the idea of automated operations." CSX currently does not use Netview/PC.

Another potential use for LU6.2 would be to support communications between Netview hosts at CSX's two data centers, "so that if something goes wrong at one

NETVIEW'S OSI network management interface will take longer to reach user sites, because vendors have yet to implement the OSI Network Management Forum specifications.

site, one Netview would tell the other and more people could act on the problem," Underhill said.

So far, vendor support has been thin for IBM's LU6.2 interface to Netview. Automated Network Management, Inc., a San Juan Capistrano, Calif., third-party Netview/PC application developer, intends to support OSI links to Netview, but not LU6.2, a company spokesman said.

Netview's OSI network management interface will take longer to reach user sites, because vendors, including IBM, have yet to implement the OSI Network Management Forum specifications that will ensure interoperability.

However, users that anticipate using Netview to monitor a wide variety of non-IBM networking systems may decide to wait for the OSI link. Mervyn's, for example, would prefer to use OSI rather than LU6.2 to link Netview to T1 multiplexers and other non-IBM systems, "because when OSI is finally ready, vendors will support it, not LU6.2," said Jim Williams, the department store chain's telecommunications manager.

Demand for OSI and LU6.2 links to Netview will get a boost when IBM makes the network management system available on OS/400 and OS/2 systems, according to David Passmore, a partner at Ernst & Young in Fairfax, Va. IBM quietly announced last month that Netview and OSI network management protocols would be available on OS/400 in September of next year and on OS/2 in March of next year. The smaller Netview "hosts" are likely to act as local managers for a specific location or network subsystem, such as a local-area network, sources said.

Linking up to these smaller Netview systems will not require Netview/PC, Passmore said, because that interface was designed specifically to translate messages into the Network Management Vector Transport protocol used by IBM mainframes.

NSF

CONTINUED FROM PAGE 53

on 10 logical subtopics — such as ceramics and polymers — previously defined by NSF.

Topic also allows the assignment of weights so that subtopics — which can be nested to any number of levels — thought to be most relevant will pop up first in inquiries.

STIS runs on a Sun Microsystems, Inc. 386i Unix workstation at NSF headquarters here, and it can support 10 simultaneous users at 9.6K bit/sec., according to Godwin. She said 200M to 300M bytes of data will be on-line within a year. The workstation connects to an Internet gateway on a local-area network at NSF headquarters.

The National Institutes of Health set up its own on-line retrieval system, called NIH Grant Line, in July. The free service, also accessible via dial-up or Internet, has 1,500 registered users and contains information about NIH announcements, meeting notices and requests for grant applications. For information, call (301) 496-7554.

Similar information from the Department of Energy, the National Aeronautics and Space Administration, the Office of Naval Research and the Federal Aviation Administration is available from the Federal Information Exchange. Its 1,200 users must currently dial in directly, but a connection to Internet is in the works, a spokesman said.

enhanced, making it easier than ever to use, monitor problem alerts, and "talk" with IBM and non-IBM systems.

Of course, there are other attractive features of NetView to consider.

Like how it helps you better manage your company's voice and data information.

The way it cuts down network costs.

Or how it enables you to finally turn your network into the profitable corporate resource it was meant to be.

Which, all things considered, can paint a pretty picture for your company's future.

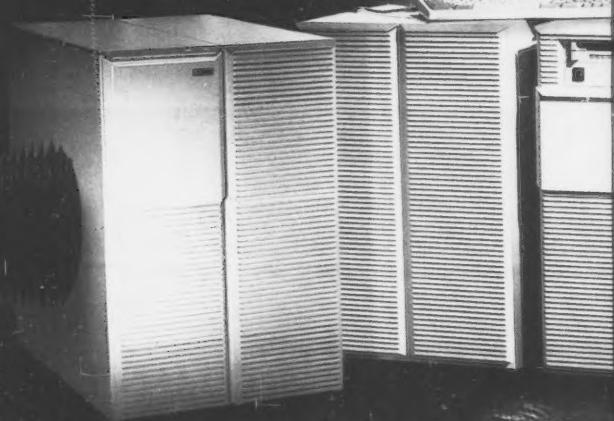
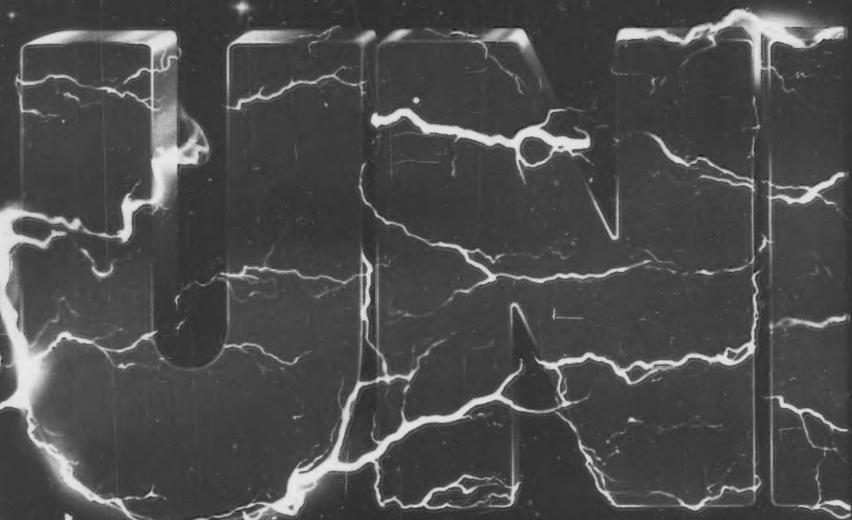
To find out how IBM can help you make the most of your network, call your IBM Marketing Representative.



Size a Bull

Four new UNIX systems make Bull's line longer and stronger than ever.

3
MIPS



KNOW BULL

*UNIX is a registered trademark of AT&T. Oracle is a registered trademark of Oracle Corporation. Informix is a registered trademark of Informix Software, Inc. Uniplex is a registered trademark of Uniplex Integration Systems, Inc. Unity is a trademark of Unity Corporation. Copyright © Bull HN Information Systems Inc., 1990.

The DPX/2 Line

100 Family
200 Family
300 Family
500 Family

Featuring

Intel, Motorola
and MIPS
processing
technologies

Bull Open
Software
environment: an
enhancement of
UNIX System V
Major standards
compliance
(X-Open, IEEE,
OSF, SVr4)

Symmetrical
multiprocessing

Open
Architectures
(AT, VME,
Multibus II)

Outstanding
capacity

Connectivity
to more than
500 users

Storage to
40 Gigabytes

Up to 576 MB
Memory

Broad selection
of industry
solution
products:

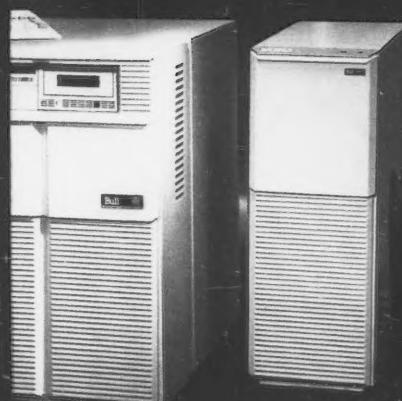
RDBMS
(Oracle,
Informix,
Unify)

Telecommunications,
Wide and Local
Area (SNA,
TCP/IP, OSI)

Office (Uniplex)

Best price/
performance
of their class

68 MIPS



One of the industry's best and broadest
UNIX* lines is growing again.

Bull now provides unbeatable price/performance
across a wide range of systems.

At the top end, Bull is introducing two of the
most powerful multi-user systems based on
Motorola's 68040 CISC and MIPS' R6000 RISC
technologies. At the entry level the line has been

extended with two new attractively-priced models.

Bull adds significant value through system
level design and manufacturing; a wide variety
of communication products; outstanding
capacity; worldwide support, integration and
services. Know Bull.

Learn more. Call 1-800-233-BULL x130 for
a copy of the Bull DPX/2 Systems brochure.

**Worldwide
Information
Systems**

Bull

Booker

FROM PAGE 53

dard 802.6 initially provides for T3 (45M bit/sec.) and T1 (1.5M bit/sec.) access, moving to support for the international Sonet specification of 150M bit/sec. in the future.

But will SMDS, which looks so wonderful on paper, break users' hearts, much as the Integrated Services Digital Network (ISDN) has? The answer is no, but more on that in a moment.

Earlier this month at Interop '90 in San Jose, Calif., Bellcore sketched out a three-tiered implementation plan for SMDS:

- Phase One (1990-1991): Establish SMDS service "presence" over the next 12 to 15 months.
- Phase Two (1992-1994): Based on Bellcore generic requirements, additional capabilities — including various network management features — will be added to the service. Interchange and local exchange companies cooperate to provide early nationwide service.
- Phase Three (late 1994 and beyond): Expand SMDS capabilities to accommodate higher speed broadband access (150M bit/sec.). Local broadband switches and tandem switches

BIT BLAST LAN services bundled

AT&T is beckoning the growing number of companies needing to link local-area networks over a wide area with a repositioning of its data service offerings. AT&T has bundled services such as its Accunet T1.5, Switched Digital Services, Packet Services and Customer Controlled Reconfiguration into what its sales force will tout as a LAN-interconnect "solution."

The carrier plans to sell services from the package primarily to companies with infrequent LAN-to-LAN traffic; switched services are often more economical for such companies in that they pay for bandwidth only when they use it.

Digital Equipment Corp. has decided to change the name of Lanworks rather than risk delaying shipments of the personal computer integration product while it engages in a lengthy legal battle, the company said. A Maryland-based company called Lanworks, Inc. challenged DEC, and a federal judge has issued a preliminary injunction against DEC's use of the name in several states, a DEC spokesman said. The first Lanworks product began shipping on time last month; a new name has yet to be chosen.

arrive to connect these local SMDS switches within and across LATA boundaries.

Two days earlier, in Chicago, AT&T Network Systems said it had developed a high-speed, fast-packet switch to support SMDS. The BNS-200 Broadband Networking Family is already being tested by BellSouth, Nynex, Pacific Bell and Southwestern Bell in their

SMDS trials, said AT&T, which hopes to make the switch generally available in the third quarter of 1992.

Why will customers and carriers rush to SMDS over ISDN? First, there's the market reality. Data services, which only account for 5% of all public network traffic, are nevertheless a growth area for carriers; moreover, data services are predomi-

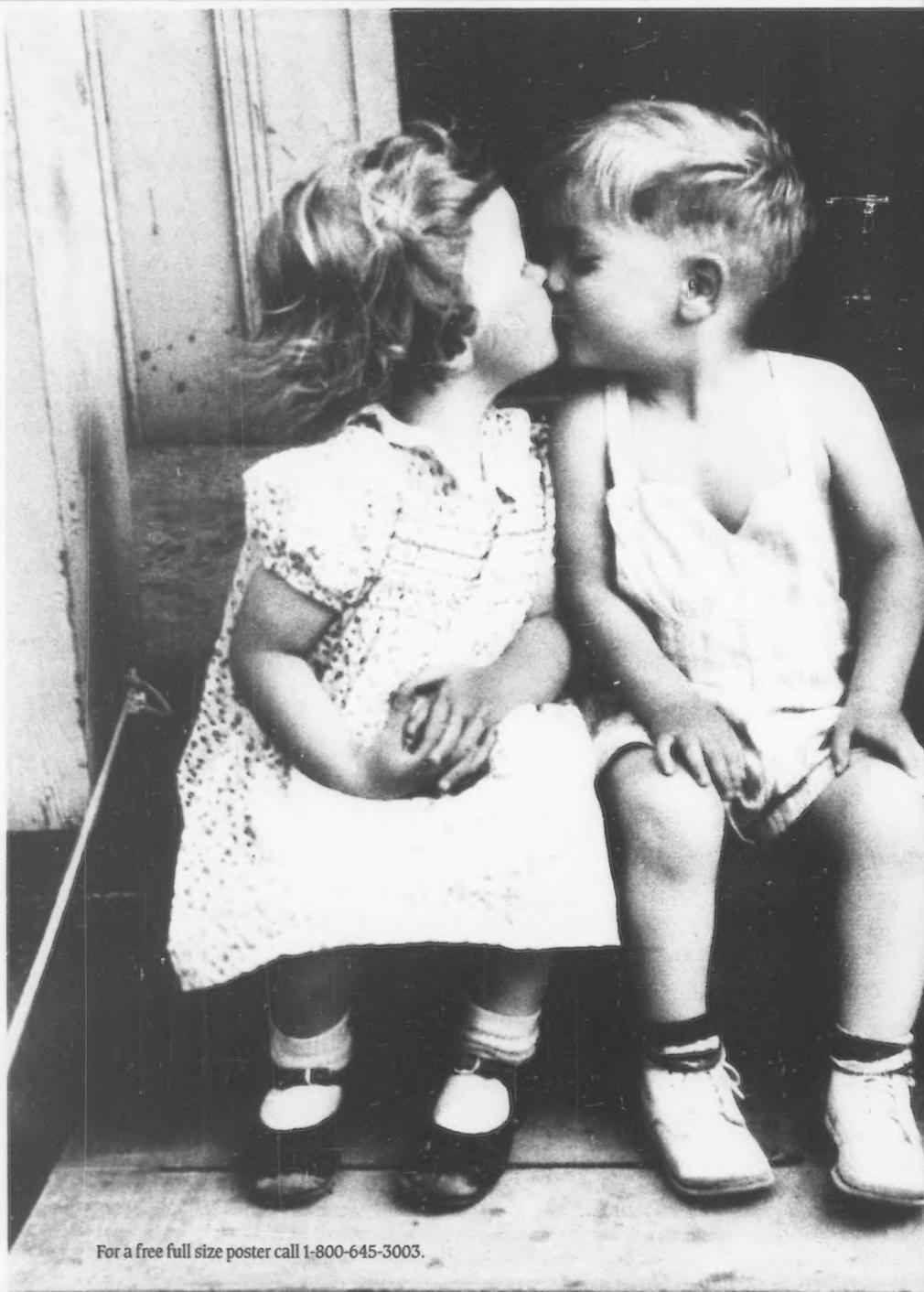
nantly sold to business customers, a key market for carriers.

Meanwhile, many of those corporate telecommunications customers have despaired about the slow deployment of ISDN for years. Ubiquitous ISDN, if it ever arrives, will make terrific sense for telemarketing operations (thanks to features like automatic number identification), but it is not opti-

mized for data transport, these users say.

In other words, while ISDN evolved naturally from analog voice telephony, SMDS, like the LANs, supercomputers and image workstations it will interconnect, has its roots in data networking.

Booker is *Computerworld's* Chicago bureau chief.



For a free full size poster call 1-800-645-3003.

NEW PRODUCTS

Micro-to-host products

Network Software Associates, Inc. and Future Soft Engineering, Inc. have developed a connectivity software package designed for IBM Personal Sys-

tem/2s and compatibles running Microsoft Corp.'s Windows 3.0 or Hewlett-Packard Co.'s New Wave.

Dynacomm/Elite provides multisession IBM 3270 Personal Computer-to-host connectivity and LU6.2 advanced program-to-program communications. A

stand-alone version with 3270 features will be available next month for \$495.

Network Software**39 Argonaut**

Laguna Hills, Calif. 92656
(714) 768-4013

Dataviz, Inc. has announced Version 4.5 of MacLinkplus/Wang VS and MacLinkplus/Wang OIS connectivity software packages.

The products support transfers of Wang Laboratories, Inc. Wang Integrated Image System images from Apple Computer, Inc. Macintosh machines to Wang VS systems. MacLinkplus/Wang VS costs \$395, and MacLinkplus/Wang OIS costs \$495.

Dataviz

35 Corporate Drive
Trumbull, Conn. 06611
(203) 268-0030

Packet/PC, Inc. has announced Packet/Flash, a bit compression software package designed to reduce the response time of communications done by users of IBM Systems Network Architecture-based 3270 machines and personal computer users who dial into an X.25 packet network.

The package uses Packet/3270 emulation software to provide quick access to electronic mail and transaction processing applications.

Packet/Flash began beta testing in August and is scheduled to be released this month. It reportedly will cost \$6,000 for the mainframe component and \$75 per PC for the first 50 copies.

Packet/PC

270 Farmington Ave.
Farmington, Conn. 06032
(203) 678-1961

Local-area networking hardware

Hayes Microcomputer Products, Inc. has announced Hayes for LANs, a family of Ethernet local-area network adapters designed for IBM Personal Computer ATs, XTs, Personal System/2s or compatibles.

The line includes Ethermate 8 (\$249), an 8-bit half-card designed for thick or thin Ethernet cables; Ethermate 8UTP (\$329), an 8-bit half-card that supports thick and unshielded twisted pair (UTP) Ethernet cables; and Ethermate Trio 16 (\$349), a 16-bit board that supports thick, thin or UTP Ethernet cables.

Ethermate 8 is already available, and Ethermate 8UTP is slated to ship this month. Ethermate Trio 16 is scheduled for availability in mid-November.

Hayes
P.O. Box 105203
Atlanta, Ga. 30348
(404) 449-8791

Intellicom, Inc. has announced the Quick-Net 3000 Plus series of 10M bit/sec. 10BaseT-based local-area networking wiring concentrator/repeaters, network interface adapters and transceivers.

The Model 212 wiring concentrator (\$999) can be used to regenerate received signals for broadcast to attached host computing devices and concentrators. The Model 401 transceiver (\$129) allows a coaxial access unit interface 15-pin-based network adapter card to be interfaced with a 10BaseT concentrator.

The Tpair-8T (\$325) and Tpair-16T (\$449) network adapters include a built-in access unit interface connector that supports connections to coaxial Ethernet networks.

Intellicom
20415 Nordhoff St.
Chatsworth, Calif. 91311
(818) 407-3900

Now That D & B Software Offers Two Competitive, Financial Products Where Does That Leave You?

Uncertainty is the last thing you want to feel about the financial software your company depends on.

Which is why more and more, both McCormack & Dodge and MSA clients are considering Masterpiece®.

Masterpiece is a totally integrated, comprehensive financial software solution from Computer Associates.

For MVS, VSE, AS/400, s3x, and VAX, Masterpiece offers superior technology and unsurpassed flexibility.

It also comes with considerable peace of mind.

Masterpiece is supported enthusiastically and unequivocally by the world's leading independent software company, Computer Associates.

Dial 1-800-645-3003 to find out more about the financial software that's behind America's most successful companies.

Call today, before somebody breaks your heart.



CA's Computing Architecture For The process and enhance the value of every CA software solution.



Software superior by design

©1990 Computer Associates International Inc., 711 Stewart Avenue, Garden City, NY 11530-4787. All trade names referenced are the trademarks or registered trademarks of the respective manufacturer.

If
you've tried
to connect your
Novell LAN to the
corporate network
and ended up
just seeing red..

We need to talk.

When you want to combine the services of your LAN with resources on your corporate network, it's time to call Wollongong.

As you've probably discovered, most corporate networks include several different operating systems, often with proprietary hardware and software.

Only Wollongong has the software products that connect all these dissimilar resources, because we base our solutions on open systems standards.

Only Wollongong lets you preserve your past investments, extend your existing systems, and guarantee the flexibility of your network for the future.

In fact, for over 10 years, we've been helping Fortune 500 companies build corporate networks in multi-vendor environments.

So now, when you visualize the future of your corporate network, there's no reason to just see red.

Call 1-800-872-8649 (in California 1-800-962-8649) or write The Wollongong Group, Inc. 1129 San Antonio Road, Palo Alto, CA 94303.

When you need to network, we need to talk.

WOLLONGONG

The leader in multi-vendor networking.SM

Judging By Other CASE Products, 80% Of Your Workload Doesn't Exist.

Most CASE products only scratch the surface of your development problems.

That's because they're designed exclusively for developing new systems. But when it comes to maintaining older systems—the biggest chunk of your workload—most CASE tools leave you out in the cold.

Fortunately, one company delivers a complete CASE solution: Index Technology Corporation. Our latest product offering, **Excelerator®** for Design Recovery, lets you bring your existing systems into the CASE environment.

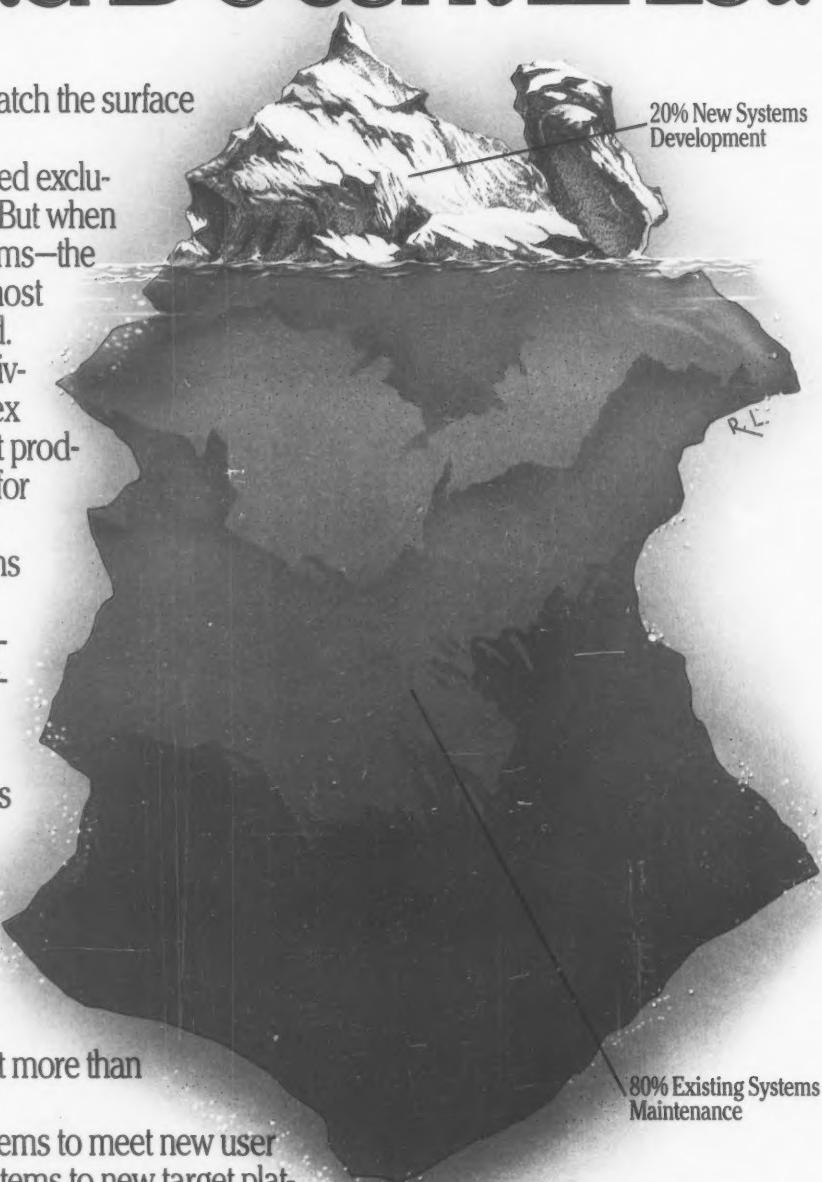
This innovative product translates complex code into clear, easy-to-understand diagrams. It scans COBOL data and procedure divisions, IMS database definitions, plus IMS/MFS and CICS/BMS screen maps—and captures their underlying structures in a CASE repository.

With Design Recovery and the other powerful products in our Excelerator Series, you can do a lot more than just develop new systems.

You can also modify old systems to meet new user requirements, migrate existing systems to new target platforms, or even adapt old systems to support new business goals. All of which means you won't have to scuttle your current investments to keep pace with your changing needs.

For more about our complete CASE solution, call us today at 1-800-777-8858—before the biggest part of your workload takes you under. There's No Substitute For Experience.

Excelerator is a registered trademark of Index Technology Corporation, One Main Street, Cambridge, MA 02142. IBM is a registered trademark of International Business Machines Corporation.



Index Technology

MANAGER'S JOURNAL

EXECUTIVE TRACK

Thomas H. Dega has been named assistant director of the Internal Revenue Service's Martinsburg Computer Center in Martinsburg, W. Va.

The center is the federal income tax record-keeping center of the IRS, maintaining and updating individual and business tax returns on magnetic tape.

Dega had been director of the office of input processing for information systems development since 1987. He was appointed to his current position after completing the IRS executive selection and development program.

Dega became director of the office of electronic filing in Washington, D.C., in 1986. Before that, he held IRS positions in Detroit, Kansas City, Mo., and Andover, Mass. He began his IRS career in 1964 as a tax technician in Milwaukee.

He holds a bachelor's degree in economics from the University of Wisconsin at Milwaukee and a certificate in public administration from Syracuse University.

Rex Schemerhorn was named manager of IS in the production control and systems department of Diamond-Star Motors Corp. in Normal, Ill.

Diamond-Star Motors is an automotive joint venture that is 50% owned by Chrysler Corp. and Mitsubishi Motors Corp.

Schemerhorn was previously assistant manager of IS. He joined Diamond-Star in 1987.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo to or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Values come before IS technology at personal care products maker The Body Shop

BY CLINTON WILDER
CW STAFF

When a visiting journalist is the only person at corporate headquarters wearing a necktie, you know that a company is different. And The Body Shop, Inc. decided this is.

The fast-growing personal care products company is a place where all paper, including computer printouts, is either recycled or shredded into packing material to stuff mail-order cartons. Sweatshirts and sneakers are standard business dress, opposition to animal testing and rain forest destruction are stated corporate goals, and dynamic company founder Anita Roddick has appeared on the cover of *Inc.* magazine with the weighty introduction, "This woman has changed business forever."

In this unique corporate culture, information technology plays a critical role in warehousing, distribution, order processing and other typical retail functions. Systems manager Rick Hellar is responsible for enhancing The Body Shop's business with technology — but not at the expense of The Body Shop's mission.

"First and foremost are the values," Hellar says. "With technology, there are certain things we don't do. We don't use bar codes on the product labels, for example; that would deface them. That's just not appropriate to our philosophy and the way our customers view us."

The same philosophy also rules out electronic mail and automated call answering; the company insists on human interaction. "Technology is not the driving force here," Hellar adds. "We have a deliberate strategy to use technology as an enhancement."



Hellar has his hands full keeping up with The Body Shop's growth plans

Joyce Ravid

Hellar and his company are far from computer technology Luddites, however. Hellar, a former senior systems analyst at Carter Hawley Hale Stores, Inc. and consultant at Coopers & Lybrand, waxes as enthusiastically about his new IBM RISC System/6000 as any hard-core techie. The Unix-based minicomputer will replace an NCR Corp. Tower that The Body Shop's information needs have outgrown.

For Hellar and his staff of one — Karen Mueller, manager of the network of 32 Apple Computer, Inc. Macintoshes — keeping up with The Body Shop's information demands is no small matter. The UK-based company's plan for growth in the U.S. is truly staggering.

There are about 25 retail stores in the U.S. now, with 40 expected to be opened by the end of the year. Plans call for 50 to 60 new stores in each of the next two years, by which time The Body Shop will have a major product-mixing, bottling and packaging operation running at its U.S. headquarters building in Cedar Knolls, N.J. Worldwide sales, from 450 stores in 37 countries, are about \$150 million.

"The biggest part of my job is deal-Continued on page 68

Taking the fast track to decentralization

BY CLINTON WILDER
CW STAFF

If information systems management on Wall Street is life in the fast lane, Charles H. Mayer fits right in.

After less than one month as the new chief information officer and managing director at First Boston Corp., Mayer is already working on an IS decentralization plan. Although the management details are still being worked out, Mayer wants to have individual IS groups assigned to fixed income securities, equity trading, investment banking and corporate support. Under the current structure, all systems development is centrally coordinated.

"We'd like to set up groups with

more product orientation," Mayer said in a recent interview at his midtown Manhattan office. "We could have four CIOs, one for each group."

The goal of the plan is a familiar one for IS in the '90s — getting those who understand the business closer to the development of systems for gaining advantage in the business. Mayer said he believes that competitive advantage comes more from identifying the right market needs than from choosing the latest technology.

"It sounds great to use buzzwords like neural networks and artificial intelligence, and many [financial firms] have tried them," he said. "But

very few have produced bottom-line results. What you need is the ability to respond quickly to market opportunities; technology is still a tool."

Mayer, 43, has spent about 20 years in IS on Wall Street and developed Morgan Stanley Group, Inc.'s Trade Analysis and Processing System.

Mayer's commitment to empowering business units with decentralized IS is more than lip service. "If you do it right, there is less need for a strong central technologist," he said.

"Maybe the right thing to happen is that I work myself out of a job in three to five years. That would be a success for me."



First Boston's Mayer

Skin deep

FROM PAGE 67

ing with growth," says the 31-year-old Hellar. "If you come back in a couple of years, you won't even recognize us."

Ironically, although The Body Shop emphasizes human values, it embodies many characteristics of the Information Age firm that

are trumpeted by management gurus. It is fast-paced, flexible and managed with a minimum of bureaucracy. In many ways, it is an IS manager's dream.

"At other companies, a [senior executive's] open door policy means the door is open if you make an appointment three weeks in advance," Hellar says. "Here, it is really open, and that's very unique, very condu-

cive to new ideas. It's a very entrepreneurial atmosphere with a lot of room to suggest and come up with solutions."

One new idea, enabled by information technology, is Homebase, which allows homebound residents to work as part-time Body Shop mail-order takers. Although the current technologies are telephones and facsimile machines, Hellar plans to provide

on-line terminals in the future.

It's not an act of charity; The Body Shop needs the people to staff its fast-growing mail-order business, which handles 3,500 calls per week. "We can't get employees in here fast enough," says Janine Newcombe, the firm's inventory and marketing coordinator.

Most strategic business applications, such as sales modeling

and pricing structures, are done on the Apple Computer, Inc. Macintosh. One of The Body Shop's important competitive differentiators is giving customers information about its unusual products, which range from Moroccan mud shampoo to Japanese washing grains to Chinese rice-bran body scrub. Product information manuals are published with the Macintosh using Aldus Corp.'s Pagemaker — on recycled paper, of course.

Another project, scheduled to go live this month, calls for franchise store owners to place their weekly orders with Telxon Corp. handheld terminals instead of fax machines. Hellar says he expects

© Eastman Kodak Company, 1990



Kodak optical storage libraries can store more data, more quickly, in less space, at less cost than any other comparable system.

With the KODAK Automated Disk Library Model 560, you can store 4,000 2-drawer file cabinets (up to 75 gigabytes of information), in the space of one. It accepts both WORM and erasable drives, and fits under a table. For centralized systems, the Kodak 6800 library stores more information than 16,000 4-drawer file cabinets (over a terabyte of information), and lets you find any file in 6.5 seconds. That means better, quicker decision making and happier customers.

Whether you are in banking, insurance, engineering or medicine, find out how Kodak optical storage libraries can be integrated to meet your requirements. For a complete package of product information and knowledgeable follow-up, call: 1 800 445-6325, Ext. 993B. So much data, so little time.

STORE THOUSANDS OF FILE CABINETS IN ONE. KODAK

See us at
COMDEX/Fall '90
November 12-16, 1990
Las Vegas, Nevada

The new vision of Kodak



"How can my SNA customers access X Windows?"

It looks like X windows is the graphics standard for the 90s. My SNA customers are really anxious to tap into the new X applications.

There's an answer...

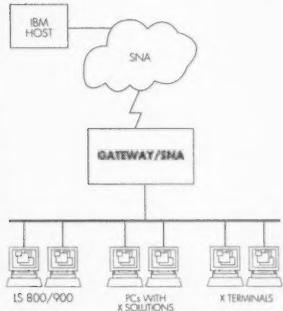
Spectragraphics.

With the LanSet Gateway/SNA, I have full access to both 3179G and X windows graphics applications.

The Gateway/SNA offers high speed SNA connectivity with Ethernet. My customers can work freely with their 3179G graphics programs, as well as the new X window applications.

And the Gateway/SNA provides the flexibility for connecting all of my X window resources including Spectragraphics LanSet 800/900 stations, competitive X stations, workstations and PCs running X windows.

Spectragraphics LanSet Gateway/SNA. Now my SNA customers have the right connections for access to the fast-growing Xwindows environment.



FREE X WINDOWS GUIDE.

For more information on the LanSet Gateway/SNA or a free copy of the X windows Guide, call (619) 587-6969, FAX (619) 450-0218. Or write, X-Guide, Spectragraphics Corporation, 9707 Waples Street, San Diego, CA 92121.

SPECTRAGRAPHICS

**CONNECTING WITH
YOUR IDEAS**



*I'm sitting in a
about my son
above our house
I told him that
hand; however,
some unknown
and my little boy*

MAINTENANCE

*come up with
actually happen.
switch is devoted
for the tip and he
fly right, Dad,
for me going to*

*corner office on a round planet and I'm thinking
and how last night he looked at the crescent moon
and said, "Daddy, broken moon, broken moon." And
the moon would be fixed soon by a silent and unseen
the PBX that I bought for the corporation from
company might not be fixed any time soon at all,
who is only five said, "Dad, AT&T has a REMOTE
lab in Denver set up to detect any problems that might
their DEFINITY® System and fix them before they
You see, Dad, a full 1/3 of the memory of a DEFINITY
entirely to self-maintenance." And I told him thanks
looked up at me and said, "Straighten up and
because no silent and unseen hand is going to pay
college."*

AT&T provides several levels of remote maintenance and diagnostic services around the clock. Please call 1 800 247-1212, Ext. 106, for more information or a free copy of THE AT&T CATALOG. In Canada call 1 800 387-6100.



BOOK REVIEW

High time for the dawning of New Age IS management

COMPUTERIZING THE CORPORATION
By Vicki C. McConnell and Karl Koch
Van Nostrand Reinhold, \$32.95

It is up to New Age management techniques to make information technology more useful to companies. Or so argue the authors of *Computerizing the Corporation*, in a readable, useful book that challenges top corporate management to forget its preconceptions about the value of technology and consider carefully the true impact a new system has on a company's operation.

Computerizing the Corporation is centered on the belief that "problems of computerization and automation are management problems, not technical problems." The authors make several serious, though subjective, charges. For instance, they believe that management has created a fantasy world of what information technology can do for a company. As an extension of this fantasy world, McConnell and

Koch say they believe that most organizations treat computers as though they were living things, looking at them to solve problems that the authors consider purely human.

The authors also charge that most companies work to integrate human and technical systems, rather than treating the technical system as a tool to improve the way workers work. In other words, by paying more attention to the technology's potential than how a particular company operates, corporations have, by and large, adopted entirely mistaken approaches to computerizing.



That's a strong statement, and while it is difficult to refute, given, for instance, *Computerworld's* own surveys that repeatedly show user dissatisfaction with systems, there is little statistical evidence in the book to back it up.

McConnell and Koch do sprinkle a number of case studies, both successes and failures, throughout the book, which provide solid illustrations of their points. One such example cites a "Midwestern farm equipment manufacturing company" that implemented an on-line inventory control system. The company, though, failed to train the personnel assigned to the system in basic computer use. Even worse, the IS staff interacted poorly with users. As a result, the inventory control system was not fully live for 10 months after its original deadline and cost the company \$750,000 more than it originally expected.

The book, which strongly urges that systems are not implemented at the expense of employees but rather to help them grow, ends up reading a bit like a touchy-feely approach to management. Yet punches are not pulled, and in fact corporations are rather soundly pummeled.

For example, in the case of the farm equipment company, the authors point out that the workers could not be blamed for the cost overruns and delays, because the new system represented a new way of working — one that made the workers feel stupid, not skilled. McConnell and Koch say "the typical management response has been that the workers will get used to the new system and will eventually learn how to use it . . . The responsibility for the transfer of new technology to the worker rests with senior management."

Solutions, too

Management frequently gets hit with such shots, as the authors strive to introduce basic human reactions to change into the equation of automating. But the book does not just bash management — it does offer solutions to the issue of automating. The salve comes from exhaustive lists of recommendations for implementing either new systems or replacing old ones.

There is, despite the focus on employees, a strong belief that information technology can be used to offer a company a competitive advantage. But the authors feel that it is a trap to believe that just computerizing will make a company better. Instead, they say that companies must use technology to make employees work better. For those that fail to do so, the authors warn, "bankruptcy will become easier every year."

It should thus be no surprise that communication among and between human beings is the ultimate focus of this book. The authors pound away at this theme, encouraging extensive information gathering and careful thought to developing and implementing a system to guarantee that users will "own" the system and, therefore, put it to work. They also challenge IS departments to keep the lines of communication open with other departments.

There is certainly enough reality in *Computerizing the Corporation* to make the New Information Age sound like it got here just in time.

MICHAEL FITZGERALD

Fitzgerald is a *Computerworld* Midwest bureau correspondent.

More Preferred Stock.

At Data Preference, you're assured of filling all your computer needs—from a single source. Because, whatever your Apple® preference, we have more of it in stock.

Blue-chip stock—like the new Macintosh IIIfx—Apple Computer's fastest, most powerful Mac® ever. Plus, more of the high-performance Macintosh IICi. Offering built-in video support, it runs most applications up to 45% faster than the Macintosh IIcx. And we're also well-stocked with the fast and expandable LaserWriter® II.

DATAPreference

Formerly Leasmetric Data Communications, Inc.

MicroAge®



Having the rental industry's largest, most comprehensive stock of Apple products, however, isn't the only reason so many companies are bullish on Data Preference. We also offer more preferred services and options. Like installation, on-site maintenance and return-to-depot programs. Plus a toll-free number for on-line diagnostics. As well as financial plans that fit your individual needs and personal preference. Perfectly.

So call Data Preference now—and get more dividends on the stock more people prefer.

Northwest 800.343.7368, 415.574.5797 • Southwest 800.638.7854, 818.708.2669
Central 800.323.4823, 708.790.2050 • Northeast 800.241.5841, 404.925.7980
London 011.44.923.897000. Copyright © 1990 Data Preference Incorporated.
Apple, the Apple logo, Mac, Macintosh and LaserWriter are registered trademarks of Apple Computer, Inc.



Starting
November 12,
it will be hard
to resist our
advances.

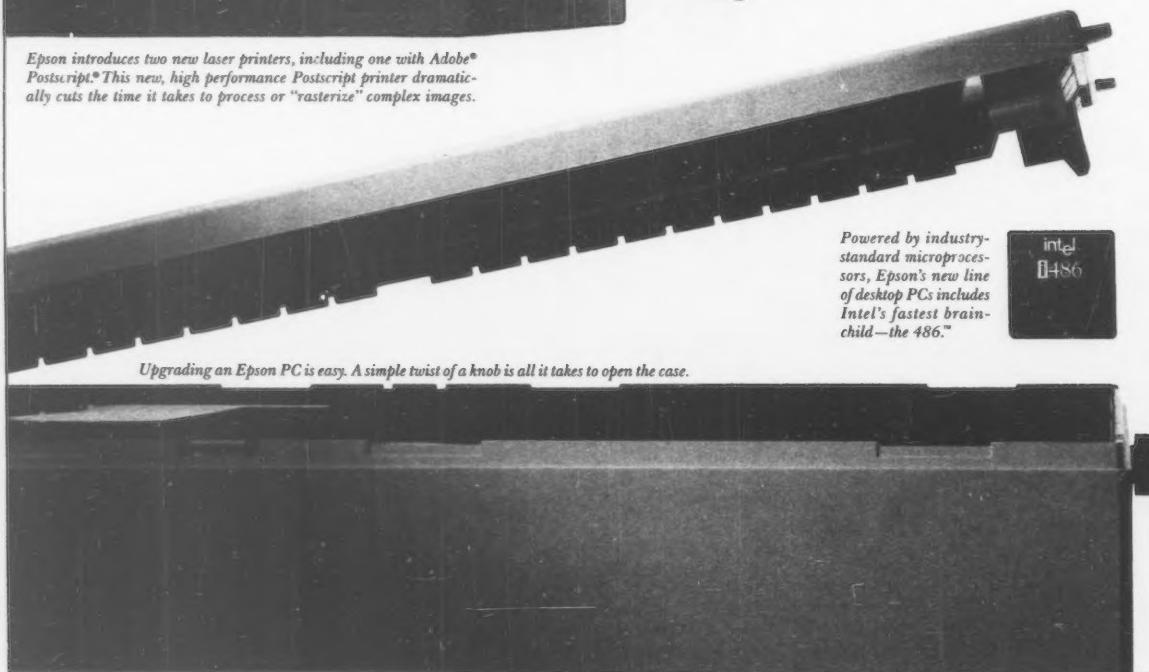
Technicall



Epson introduces two new laser printers, including one with Adobe® Postscript.™ This new, high performance Postscript printer dramatically cuts the time it takes to process or "rasterize" complex images.

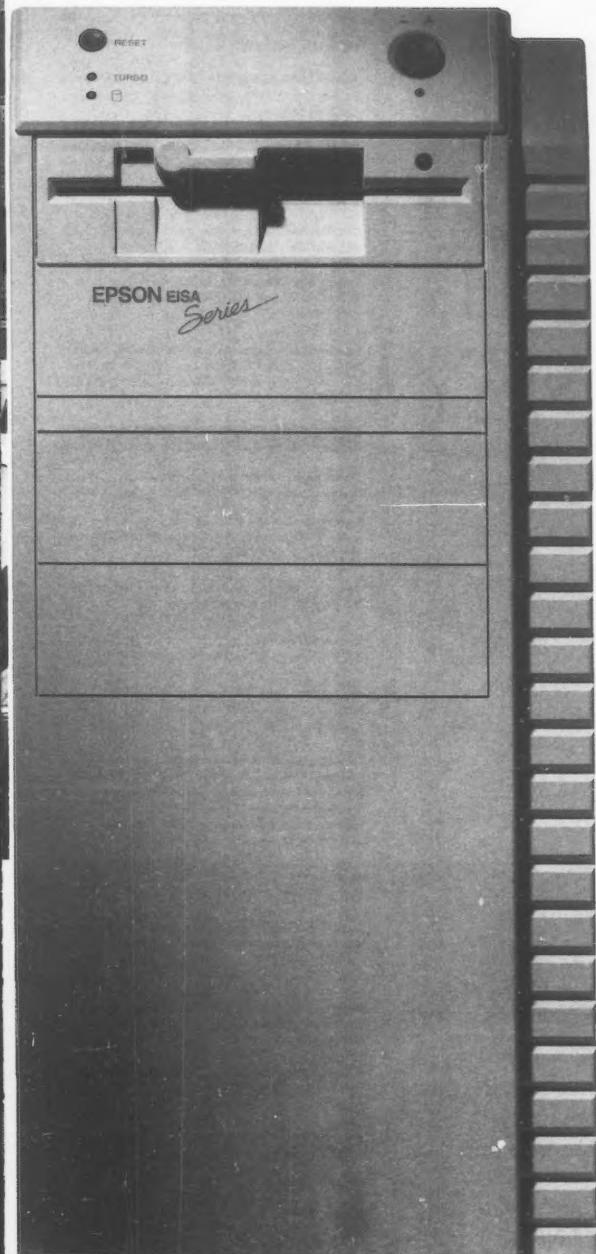
Powered by industry-standard microprocessors, Epson's new line of desktop PCs includes Intel's fastest brain-child—the 486.™

Upgrading an Epson PC is easy. A simple twist of a knob is all it takes to open the case.



To witness the intelligent advances and insightful engineering of Epson® computer systems and laser printers, visit

y speaking.



A file server with a future. Epson's new EISA Series tower has interchangeable processor boards that let you easily upgrade from a 386™/33MHz computer to a 486™/25MHz.

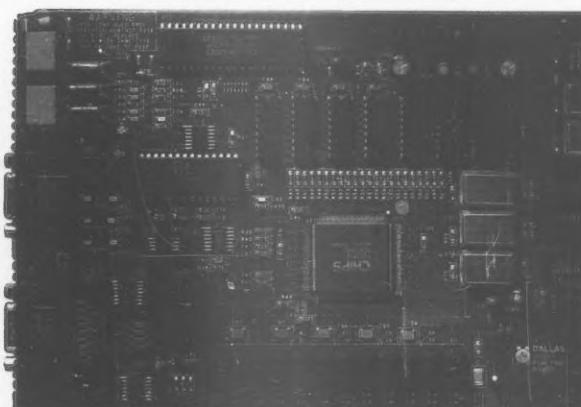


Building a no-compromise 386SX notebook computer is no small feat. Especially one that weighs a mere 5.8 pounds and features a 20 or 40MB hard drive, 3.5" floppy drive, page-white VGA screen and large, comfortable-size keyboard.

Engineered For The Way You Work.™

EPSON

Epson's meticulous motherboard design packs more performance in less space, improves reliability and places VGA on board, leaving an extra expansion slot for whatever else you have in mind.



Booth 1178/East Hall at COMDEX this November. You won't be disappointed.

Epson is a registered trademark of Seiko Epson Corporation. 386 and 486 are trademarks of Intel Corporation. Postscript and Adobe are registered trademarks of Adobe Systems, Inc. ©1990 Epson America, Inc., 2790 Lomita Blvd., Torrance, CA 90505. (800) 822-8911.

CALENDAR

The 2nd National EDI Systems Conference & Exhibit will take place Dec. 3-5 at the Washington, D.C., Hilton & Towers. The conference includes more than 40 concurrent session presentations by electronic data interchange users and consultants, as well as vendor exhibits. Keynote speakers from the user community are Robert Ferkenhoff of Sears, Roebuck and Co., Max Hopper of American Airlines and Carol B. Hall, commissioner of the U.S. Customs Service.

More information is available from the The Electronic Data Interchange Association, Alexandria, Va. (703) 838-8042.

NOV. 4 - 10

Adapsco Management Conference. Phoenix, Nov. 4-7 — Contact: Adapsco Education Department, Arlington, Va. (703) 284-5355.

Guide 78. Atlanta, Nov. 4-9 — Contact: Guide, Chicago, Ill. (312) 644-6610.

XPLOR Electronic Document Printing Professional International Conference. Nashville, Tenn., Nov. 4-9 — Contact: XPLOR International, Palos Verdes, Calif. (800) 669-7567.

Decision Support and Executive Information Systems: A Managerial Perspective. Cambridge, Mass., Nov. 5-6 — Contact: Decision Support Technology, Bos-

ton, Mass. (617) 482-3596.

Successful Implementation of Imaging Technology. Boston, Nov. 5-6 — Contact: KPMG Peat Marwick, Executive Education Registrar, Montvale, N.J. (800) 762-3700.

Synoptics Communications Users Group Meeting. Santa Clara, Calif., Nov. 5-6 — Contact: Amparo Lago, Synoptics, Mountain View, Calif. (415) 691-7174.

CASE: The Next Generation. Washington, D.C., Nov. 5-7 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

ISDN Week. London, Nov. 5-9 — Contact: IGI Europe, London, England (011) 41 61 6915111.

Association for Computing Machinery Conference. Arlington, Va., Nov. 6-7 — Contact: Jim Adams, ACM, New York, N.Y. (212) 869-7440.

Nonprofit '90 Conference. Atlanta, Nov. 6-7 — Contact: Barbara Acerly, Inform, Atlanta, Ga. (404) 220-2640.

Messaging '90. New York, Nov. 6-8 — Contact: Information Publishing Corp., Houston, Texas (713) 974-6637.

Digital Dealers Association Annual Meeting. Tucson, Ariz., Nov. 6-9 — Contact: DDA Administrative Office, Chelsea, Mich. (313) 475-8333.

Understanding IBM's Operations and Systems Management Strategy. Chicago, Nov. 7 — Contact: New Science Associates, Southport, Conn. (203) 259-1661.

Computer, Office Systems & Services Conference. Houston, Nov. 7-8 — Contact: Show America Management, Houston, Texas (713) 890-0397.

Consulting: Building IS Partnerships. Cambridge, Mass., Nov. 7-9 — Contact: Jay Delaine, Index Group, Cambridge, Mass. (617) 499-1373.

Design Engineering Show and Conference. Atlanta, Nov. 7-9 — Contact: Design/South, Stamford, Conn. (203) 964-0000.

GE Information Services Business Communications Users Group Meeting. Orlando, Fla., Nov. 7-9 — Contact: Wendy Herman, GE Information Services, Rockville, Md. (301) 340-4977.

GIS/LIS. Anaheim, Calif., Nov. 7-10 — Contact: GIS/LIS, Bethesda, Md. (301) 493-0200.

Expo Comm China '90. Beijing, China, Nov. 8-13 — Contact: Ron Akins, Krause & Associates, Bethesda, Md. (301) 986-7800.

Southeastern Small College Computing Conference. Hickory, N.C., Nov. 9-10 — Contact: Dr. Frank Chestnut, Campbellsville College, Campbellsville, Ky. (502) 465-8158.

NOV. 11 - 17

Share 75.5. Fort Worth, Texas, Nov. 11-14 — Contact: Share, Chicago, Ill. (312) 644-6610.

Computer-Canada First. Toronto, Nov. 12-14 — Contact: U.S. Department of Commerce, Office of Canada, Washington, D.C. (202) 377-3718.

Autofact '90. Detroit, Nov. 12-15 — Contact: SME, Dearborn, Mich. (313) 271-0777.

Comdex/Fall '90. Las Vegas, Nov. 12-16 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

Supercomputing '90. New York, Nov. 12-16 — Contact: Malvin Kalos, Cornell Theory Center, Cornell University, Ithaca, N.Y. (607) 255-7157.

Hawaii's Governor's Symposium on High Technology: Making Strategic and Technical Alliances for East-West Software Development and Trade. Lihue, Kauai, Hawaii, Nov. 13-15 — Contact: High Technology Development Corp., Mililani, Hawaii (808) 625-5293.

Wescon/90. Anaheim, Calif., Nov. 13-15 — Contact: Wescon/90, Los Angeles, Calif. (213) 215-3976.

National Conference and Exposition on Electronic Image Management in Government. Washington, D.C., Nov. 13-16 — Contact: Conference Manager, USPDI, Silver Spring, Md. (301) 445-4400.

Build Boston '90 Technology Conference. Boston, Nov. 14-16 — Contact: Build Boston '90, Newton, Mass. (617) 955-0055.

Strategic Planning for Information and Systems. Houston, Nov. 14-16 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

NOV. 25 - DEC. 1

Conference on Software Maintenance. San Diego, Nov. 26-29 — Contact: Michelle Carbone, IEEE Computer Society, Washington, D.C. (202) 371-1013.

Video Expo. Orlando, Fla., Nov. 26-30 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Technology Management Forum, Client Serving Computing: The Impact. Cambridge, Mass., Nov. 27-28 — Contact: Forrester Research, Cambridge, Mass. (617) 497-7090.

GET THE BEST PC COBOL, EVEN IF IT SAVES YOU MONEY.

COMPETITIVE CHECKLIST

Description	REALIA COBOL	COBOL/2*	COBOL/2 WORKBENCH*
U.S. list price	\$995	\$900 + \$95 for editor	\$3,290
Automatic distribution of product upgrades	YES	FOR SOME CLIENTS	FOR SOME CLIENTS
Benchmark compile-and-link speed	25 sec. (3 times faster)	1 min. 14 sec.	1 min. 14 sec.
Benchmark execution speed	4 min. 11.4 sec. (4.3 times faster)	18 min. 17.2 sec.	18 min. 17.2 sec.
Benchmark executable file size	104,713 bytes (2.6 times smaller)	282,288 bytes	282,288 bytes
Benchmark source available for review	YES	NO	NO
DOS memory extender included	YES	NO	YES
No-charge run-time for DOS memory extender	YES	NO	NO
No-charge EBCDIC support under CICS and IMS	YES	NO	NO
OS/2 Presentation Manager support	YES	NO	YES
Dynamic Link Library support under DOS and OS/2	YES	NO	NO
Dialect support for IBM VS COBOL, VS COBOL II, ANSI-74, ANSI-85, etc.	YES	YES	YES

* Both are Micro Focus products. Company and product names are registered trademarks of their respective holders.

Micro Focus wants you to think you have to choose between the limits of COBOL/2 and the cost of Workbench. Not true.

Realia gives you the high-end product at low-end cost. You get all the speed and features you need in a COBOL compiler for the PC. And you don't have to read a foot of manuals to figure out how it works.

Developing and maintaining applications on the PC will save you time and money. Choosing Realia, for price and performance, will save you from buyer's remorse.

Call us for a free evaluation of the Realia programming environment.

U.S.: 312/346-0642 • U.K.: 071/602-8066 • CANADA: 613/725-9212

Home address _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO.1126 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

DEVELOPMENT WORLD LIBRARIES
TEN SPEEN STREET
FRAMINGHAM
MASSACHUSETTS 01701-9508



PRODUCT SPOTLIGHT

UNIX ON THE DESKTOP

The grass is getting greener

BY WILLIAM BRANDEL

In January 1990, Peter Messina did more than just hang a new calendar on the wall of his New York office. The first vice-president of corporate telecommunications at Royal Alliance Associates, a brokerage and insurance firm, was informed that the company had been acquired by the Sunamerica family of companies.

While most acquisitions present headaches for information systems managers, this one was a migraine. Messina's group was informed that it had three months to completely revamp its computing structure — everything from the mainframe to its IBM Personal Computers.

At the time, all of Messina's users — 112 customer service and money market representatives — were using AT&T 6539 split-screen terminals. More than 40 of them used PCs for word processing and spreadsheet applications. All told, users were dealing with 17 different software packages and were connected to an IBM 3090 mainframe, an IBM 4300 minicomputer and a Digital Equipment Corp. VAX 6310.

With time running out in April, Messina tried accommodating haste with simplification and sold Royal Alliance management on a centralized desktop concept — based on Unix.

"They said, 'Fine. You have two weeks,'" Messina says.

During the next weekend, Messina got rid of the IBM and Compaq Computer Corp. PCs and installed a Sun Microsystems, Inc. 390 file server running University of California at Berkeley Unix 4.2 to support the AT&T 6500 terminals.

He centralized his users and gave them access to the same word processing and spreadsheet applications in Unix versions of the popular DOS products that a third of them had already been using.

The fact that these commercial DOS applications were available under Unix was the real key to a smooth and rapid transition, according to Messina.

"With split-screen terminals,

Brandel is a free-lance writer based in Boston.

we were able to give all the brokers access to the same applications," Messina says. "And with Lotus [1-2-3] and Wordperfect available on Unix, I didn't need the 40 or so PCs anymore. At the same time, everyone who didn't have a PC was able to use it on their terminal. As far as what users saw on the screen, they

able to them. The major DOS applications have made the Unix transfer, including Lotus Development Corp.'s 1-2-3 spreadsheet, Microsoft Corp.'s Microsoft Word, Wordperfect Corp.'s Wordperfect word processing package, Autodesk, Inc.'s AutoCAD, Ashton-Tate Corp.'s DBASE, Borland International's Paradox and Informix Corp.'s Wingz, just to name a few.

"We are still predominantly a DOS shop and are just sticking our noses into the Unix tent," says Peter Patterson, senior computer systems analyst for end-user support at the World Bank in New York. "But as we are getting more of our users over to Unix, I must say that I am pleased with the number of DOS applications that have crossed over and the speed that they are getting there."

According to analysts and vendors, if Unix ever had a chance to penetrate the desktop, its time is now. OS/2, once the DOS heir apparent, has failed to dominate that territory. Europe, where Unix has established a stronger user base than in the U.S., presents a booming business environment.

Closer to home, the allure of U.S. government contracts are pulling commercial DOS vendors into Unix development. Orem, Utah-based Wordperfect first cracked the Unix market in March 1988 to run on government-owned NCR Corp. Tower systems. Today, Wordperfect is ported to more than a dozen flavors of Unix and has more developers working on Unix than OS/2, Apple Computer, Inc. and DEC's VMS operating system.

Other developers are following suit. "We now have a special marketing branch in Washington, D.C., that is dedicated to bidding on government projects," says Chris Wright, manager of Unix product marketing at Lotus in Cambridge, Mass.

"It wasn't like a General Motors or Ford came to us and said, 'I've got to have 1,000 copies of 1-2-3 on Unix,'" Wright says. "It was more like a Ford coming to us and saying, 'I'm one of your largest PC customers, and I have a large population of engineers running Sun workstations or others, and they need a good office automation suite.'"

A second reason developers are looking into Unix pastures is the growth forecast for that market. Software vendors such as Ashton-Tate that have made their millions in the DOS market are looking at the growth in the Unix segment, not at an installed base that needs to be served. Ken Rhee, Unix marketing manager of Ashton-Tate's DBASE product, believes the Unix personal database market will



John & Wendy

didn't see anything different." But what was under the hood was very different indeed, including faster processing, more robust networking and scalability.

"This system gives us more horsepower than we could have ever tried to achieve with a PC LAN," he says, "and not even near the cost."

The Royal Alliance situation represents a landmark for Unix. No longer do hardware vendors such as Sun have to tell customers that the most popular commercial applications are unavailable.

INSIDE

Product Face-Off

Looking Glass and X.desktop compete in the GUI ring. Page 80.

Product Guide

A comprehensive list of Unix terminal emulation software. Page 84.

On the Plus Side

A programmer details the ups and downs of C++. Page 79.

grow by 50% to 100% this year.

"As a company, you have to expand the business," Rieh says. "You can't just stick with a stabilized industry standard like PC-DOS."

According to Judith Hurwitz, an analyst at Patricia Seybold's Office Computing Group, a market research firm in Boston, the movement to Unix results from two ironic industry dynamics. One, she says, is code-writing proximity. The other is users' growing impatience with OS/2.

Hurwitz says that developers were already writing new Microsoft Windows Version 3.0 and OS/2 programs in C. As a result, moving to Unix was not difficult, compared with translating code written in Natural into a Unix application. Nevertheless, turning a DOS-based application into Unix is difficult.

"We did a lot of optimization for the platform, like profiling," Wright says. "To do a file retrieve on a Sparc architecture, we had to do line-by-line edits because the data file formats of 1-2-3 are designed in the Intel architecture."

The code conversion has the effect of slowing down the product, especially in terms of video performance.

"DOS is synchronous; Unix is asynchronous," says Bob Kruger, manager of Unix business development at Microsoft. "The user makes an input with an application designed for DOS, and it goes off looking around the Unix operating system and then eventually comes back to you. There is a difference in response."

"In the PC world, you just take over the hardware and go right to the video registers on the PC," Wright says. "With Unix, you are twice removed from the operating system. The video code is written to the windowing implementation, which writes to the operating system, which writes to the hardware."

"As a result, when running 1-2-3 with video performance on a Sparc system, the performance was close to that of our DOS version on a 386-based Compaq/25," Wright continues. "Without video on that 12.5-MIPS Sun, we were much faster in terms of raw performance."

On the bright side

There is an upshot to this, however. "The tools make Unix a lot easier to deal with once it's over there," Wright says. "On the Sun system, we had to develop for three different products optimized for three different hardware architectures. But it wasn't that bad just using a common source tree in Unix."

Autodesk's AutoCAD product was one of the lucky ones. Because the company developed the application on a Unix-based system from the beginning, it did

not have to make a DOS-to-Unix transition like other DOS vendors. AutoCAD currently runs on Unix, Ultrix, Xenix/SCO, Sun OS and Hewlett-Packard Co. Apollo Division's Aegis — all different flavors of Unix.

"It's actually easier to get out a Unix product," says John Forbes, manager of Unix products at Autodesk. "We develop on a Sun workstation because of the debugging environment and then move it over to DOS."

Others have shrink-wrapped their application code so tightly for DOS that they are finding the transition to Unix formidable.

For example, Wordstar International says it would like to have an application that runs on Unix. "The assembly language cannot be ported," says Amy Master, a marketing manager at the Naveco, Calif.-based company. "We are already big in gov-

ernment sales and have a great interest in developing products and taking advantage of our presence. There is a group of people in this company who are frustrated about it."

There is definitely a growing interest in Unix now that commercial applications are making the crossover," Hurwitz says. "But it's happening in bits and pieces — it's not just one big wave."

Despite this, she says, the window for Unix to get to the desktop is wide open, especially because OS/2 is failing to capture users' hearts and minds.

"Applications like databases, spreadsheets and graphics have got to move upward, somewhere," Hurwitz says. "People want to use the applications they know, and Unix is letting them make their move."

One of the most restrictive aspects of DOS is that it was designed with Intel Corp. 8086 or 8088 processors in mind, both of which run at less than one million instructions per second (MIPS). Meanwhile, the Intel i486 chip is now churning at 10 MIPS.

"If you think of the limitations of DOS — like the 640-Kbyte memory barrier, the hard disk size, I/O performance, lack of security — there are a lot of things DOS PCs are simply just not designed to do," Rieh says. "If you

even want to do some sorting in 10 minutes or less on a 360-Mbyte database, a PC can't do it. You'll just bog the processor. It needs more horsepower."

Meanwhile, some users are unwilling to wait for the unproven OS/2.

"We are here to support the business, and we are in a competitive business," Messina says. "I need to have the applications and my people working on them today."

"I've played around with OS/2, and I wasn't impressed," says Daryl Jones, IS communications manager at the South San Francisco Police Department. "I need the applications now, and I have budget restrictions. That rules out OS/2."

Jones is also enjoying cost savings. Users at the police department work on dumb terminals connected to Intel 80386- and i486-based servers, running The Santa Cruz Operation's Xenix 2.3.2. The system is loaded with a Wingz database and Wordperfect.

In one arrangement, Jones is supporting 16 users on one \$8,000 server, including software and printer-sharing equipment. On a PC LAN, it would cost him an average of \$2,500 per user.

Jones adds that daily maintenance is eased. "We don't have to put the burden of file maintenance on the user, and we aren't stuck with the training," he says. "On Unix, backups are automated by the system administrator, and meanwhile, the users are already familiar with the applications. Definitely the way to go."

But not everyone sees such

N.Y.-based accounting firm that uses Wordperfect Version 4.2. "There is a slight problem if you want to go back and forth between the two systems. We have to use the little labels that they send you to make the distinction clear."

The problem gets exacerbated when Alloway takes a floppy disk with files off the Unix system and tries to run the application on her IBM PC-compatible portable system at home. "It gets confusing," she says.

THIS SYSTEM gives us more power than we could have . . . with a PC LAN and not even near the cost."

PETER MESSINA
ROYAL ALLIANCE

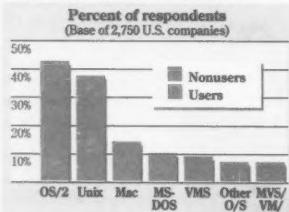
dealers' shelves? According to a recent study conducted by DMR Group, Inc. in Toronto, only 8% of 2,750 U.S. companies on the desktop, compared with 10% for OS/2 and 65% for DOS, currently have Unix installed.

The story of Unix on the desktop is another chapter in the bigger problem of the scalable operating system. Without one standard, the market and users will continue to be divided and forced to make choices.

"Until there is one standard

Now and then

More people have OS/2, DOS and Macintoshes on their desktops than Unix; however, current and prospective users rate it high in terms of future importance



Source: DMR Group, Inc.

CW Chart: Paul Mock

ernment sales and have a great interest in developing products and taking advantage of our presence. There is a group of people in this company who are frustrated about it."

"There is definitely a growing interest in Unix now that commercial applications are making the crossover," Hurwitz says. "But it's happening in bits and pieces — it's not just one big wave."

Despite this, she says, the window for Unix to get to the desktop is wide open, especially because OS/2 is failing to capture users' hearts and minds.

"Applications like databases, spreadsheets and graphics have got to move upward, somewhere," Hurwitz says. "People want to use the applications they know, and Unix is letting them make their move."

One of the most restrictive aspects of DOS is that it was designed with Intel Corp. 8086 or 8088 processors in mind, both of which run at less than one million instructions per second (MIPS). Meanwhile, the Intel i486 chip is now churning at 10 MIPS.

"If you think of the limitations of DOS — like the 640-Kbyte memory barrier, the hard disk size, I/O performance, lack of security — there are a lot of things DOS PCs are simply just not designed to do," Rieh says. "If you

This problem could be overcome by one of Unix's greatest strengths: graphical user interfaces based on the X Window System. Pointing and clicking could erase the function key problem for most applications.

"Let's face it: People aren't moving over to Unix for its command line," Forbes says. "But then, if you use a GUI, your performance takes about a 20% to 40% hit and puts it at about the same level of a PC. And with AutoCAD, we can suck up as much performance as a workstation can deliver."

"We definitely have concerns about developing a product to run on an X windowing GUI," Kruger says. "You're talking about a lot of horsepower."

Even development race

For now, developers will. All software developers contacted, with the exception of OS/2 advocate Microsoft, say their development efforts are split evenly between Unix and OS/2.

"I have a lot of work to do before I sell \$200 million annually in Unix," Rieh says. "Then, we would introduce the Unix product first. But, for now, I can say that soon the Unix product can be introduced only 30 days after the DOS version."

But again, the failure of OS/2 to capture the desktop gives the developers another migration path to frustrated DOS users.

"I don't want to specialize," Rieh says. "But let's just say I would not be surprised if in time my revenues from Unix are greater than OS/2."

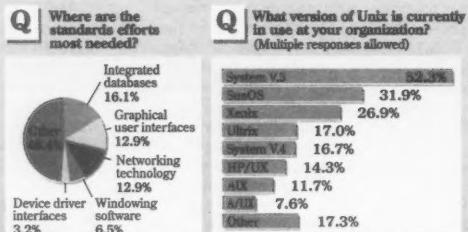
"We're crystal-ballers here, but there is a real opportunity for Unix here and now," Forbes says. "It is obvious that DOS users have to migrate up somewhere, and that question is, where?"

"The key is for the Unix market to standardize on a GUI, whether it is OSF/Motif or Open Look or whatever — and stick with it," Forbes says. "If they standardize, they could attract a tremendous number of DOS users to come over. But if they continue with more of the same politicking, that will give OS/2 application development and support a chance to catch up."



Hurry along

Members of Uniforum, the worldwide association of Unix users, agree that standards efforts are moving in the right direction but too slowly



Source: Uniforum

CW Chart: Paul Mock

transparency between the two versions of these products. Despite most vendors' claims to the contrary, there are a few things users will have to get used to when they use traditional DOS applications in Unix. For example, Microsoft Word has a tendency to flicker on Unix terminals and runs at a slower speed.

"Our Unix keyboards look the same as a PC keyboard," says Cheryl Alloway, IS director at Ronder & Legg, a Kingston,

However, Wright counters, that is just the point with Unix — you run it on systems with horsepower, such as reduced instruction set computing-based workstations. "This is exactly why we are specifically developing for a 12.5-MIPS Sun workstation."

All of this, of course, begs the question: If Unix is so great and application developers are scrambling to get a piece of the action, then why aren't more businesses rioting to pull it off?

A programmer's view of C++

FIRST PERSON

BY ALEXIS TATARSKY



Programming in a Unix environment used to be fairly devoid of choices, and when it came to what language to program in, there was no choice at all: C was it, and the C language was standard across hardware platforms and versions of Unix.

Those were the good old days. Now there are several versions of the C language to choose from, including ANSI C and object-oriented versions such as Objective C and C++.

In 1988, my firm selected C++ as its language of choice for future development efforts.

The C++ language is an evolutionary step beyond original (Kernigan and Ritchie) C, beyond ANSI C and into object-oriented techniques (see story this page).

Since C++ is essentially a superset of C, most C programs will run virtually unchanged through a C++ compiler. C programmers can learn the language incrementally, using features as they learn them but producing real code all along.

Also, existing C code does not become obsolete: As modules are added or rewritten, C++ features can be used while leaving the rest of the code unchanged.

There are two classes of differences between C++ and C: improvements to the original language and the addition of object-oriented features. Even without using the object-oriented aspects, it is still worthwhile to use C++ instead of C. The most vital of the nonobject-oriented improvements include the following:

- **Function prototypes.** In C, it is a common error to call a function with the

Tatarsky is president of Taos Mountain Software, a firm specializing in Unix applications development and training in Mountain View, Calif.

wrong number or order of parameters. In C++, function prototypes help avoid this problem. These prototypes, which typically appear in the header file, instruct the compiler about the number and types of parameters a function expects to receive.

- **Overloaded functions.** Function prototypes also make it possible to perform function overloading, or the existence of two or more functions with the same name. Using the prototype, the compiler can differentiate between the "overloaded" functions based on the types of parameters they expect.

ANSI has adopted function prototypes, as well as several other features of C++, to include in ANSI C.

- **Call-by-reference.** C++ passes parameters by reference rather than value, reducing the need for pointers — one of the hallmarks of the C language.

- **In-line functions.** In C++, the preprocessor is de-emphasized by the addition of in-line functions and true constant declarations. An in-line function is better than a C "#define" because it can check for the number and type of its parameters and have a true return value.

The real edge with C++, however, comes when you use its object-oriented features: "classes" and "inheritance." In C++, the term class refers to user-defined structured data types. Objects are defined as instances of a class, just as the C language definition:

```
int age; /* define a variable age of type
int */
```

defines "age" to be an instance of the type "int."

A class can provide (and enforce) data hiding through the use of "private members," which are fields invisible outside of the class itself. Public members provide an interface to the private data.

A class defines not only data fields but also functions that can act on objects of

the class. Such "member functions" can provide a public interface to the private data of the object itself.

As an example, here is a class definition:

```
class stack{ private:
char stack—data[MAX]; // a private data item
int top; // a private data item
public:
void push(int x); // a public operation
int pop(); // a public operation
};
```

By implementing an abstract data type by using public interface functions and a private set of data representing the state of an object, the programmer can separate the implementation of a class from its public interface.

Even if the (private) implementation changes, the interface can remain exactly the same: Code using the data does not even have to be recompiled. This highlights one of the primary benefits of C++ — its maintainability.

Different classes can also have members (including member functions) of the same name. This eliminates the "name space pollution" problem of traditional C.

For instance, classes "jet" and "truck" can each have a member function "fuel0," and the compiler will understand which one is being invoked by the context.

```
jet my 747; // define a jet object
truck mack; // define a truck object
```

```
my747.fuel0; // invokes the fuel function
for a jet
mack.fuel0; // invokes the fuel function
for a truck.
```

"Inheritance" refers to the ability to "derive" one class from another. If one has already defined a class called, for example, "vehicle," one can derive a class from vehicle, such as "truck." Objects of truck will have all the characteristics of objects of vehicle. The class truck would add characteristics specific to trucks, such as gross tonnage and type of trailer.

The latest version of C++ allows for "multiple inheritance." This allows a programmer to derive one class from more than one other class: Truck may be derived not only from vehicle, but also from "diesel" and from "depreciable asset."

Class derivation not only allows for sharing of characteristics and functions between classes with a common ancestor ("car" and truck might both be derived from vehicle) but is also a simple technique for reusing existing code.

If one has a class defined for truck, one might define "bus" in terms of truck rather than starting over again from vehicle: A bus is like a truck, except that it differs in the following ways...

C++ programs are centered on class hierarchies. Designing the classes and their interrelation (hierarchy) is the most vital phase of the development cycle. In our experience, C++ cuts development time and dramatically reduces maintenance time when compared with a conventional language. •

The darker side

There are two sides to every story, and so it is for C++. The language offers many benefits to a programmer, but there are trade-offs as well, mostly attributable to people's unfamiliarity with it.

Its benefits include the following:

- Better reusability of code over C++.
- Better maintainability of code.
- Enforcement of good programming practices.
- Encouragement of good design practices.
- Compatibility with existing C code.

On the other hand, the language itself is still in some flux, with new features being added and standardization efforts under way by ANSI and AT&T. And while the languages themselves are compatible, many tools designed to work with C do not yet have C++ interfaces.

In addition, the number of proficient C++ programmers is still small. Even though C programmers can be retrained rapidly, there is a significant ramp-up effort. Rather than thinking about the logical procedural flow of the program, the analyst's attention is instead given to designing the data "objects" on which the program is to perform. Along with the objects themselves are the operations (also called methods or functions) that are to be performed on the objects. This object-oriented approach — in which the data is central — makes for robust and modular programs.

Lastly, debugging C++ code can be difficult because many debuggers do not understand the concept of class, inheritance, virtual functions and other C++ features. Instead, one has to debug the C code generated by the C++ interpreter — code which is difficult to map to the C++ source.

ALEXIS TATARSKY

BACKUPUNET OR LOSE UDATA

BACKUPUNET—
the only way to backup
and restore networked,
mixed-platform
UNIX® environments.

For information, UCALL
(703) 264-3301.

Visit us at
UNIX EXPO Booth #857.

UNITECH
SOFTWARE INC.

UNITECH Software Inc. 1800 Alexander Bell Drive,
Suite 101, Reston, VA 22091, Fax (703) 264-7796
UNIX is a registered trademark of AT&T. BACKUPUNET is a trademark of UNITECH Software, Inc.

Toward a friendlier view

Looking Glass and X.desktop are two ways to look at Unix

PRODUCT FACE-OFF

BY DAVID FIEDLER

People still tend to fear Unix's "hundreds of commands." Well, it's true; Unix does have hundreds of commands. It's also true, however, that most users will never need to learn and use more than two dozen — the same number and type of commands they use on MS-DOS, MVS or any other operating system.

Old perceptions die hard, however, and only a radically new user interface may convince people that Unix is finally usable by mere mortals. That's why Sun Microsystems, Inc. introduced its Open Look graphical user interface and Open Software Foundation (OSF) rolled out its OSF/Motif.

What isn't always apparent amidst the hoopla, however, is that Open Look and Motif are not user-oriented interfaces in the same way as, say, Microsoft Corp.'s Windows Version 3.0. Instead, they are

standards. While they are somewhat similar in many ways, they will most likely appeal to two different user types.

Both products require about the same amount of random-access memory. X.desktop's executable size is between 250K and 400K bytes, and a minimum of 2M to 4M bytes of RAM is required for X.desktop to function. Binary code on Looking Glass uses about 600K bytes, and it requires 4M bytes of RAM.

However, Looking Glass seems to be the faster of the two products, with a proprietary tool kit that enables it to run at a blinding speed. X.desktop uses Motif's tool kit.

On Looking Glass, the user is first presented with a screen that displays several windows, including a home directory. On both products, applications are chosen by clicking on an icon, although Looking Glass allows you to use either icons or names. Both vendors say the next version of their products will support colorable icons.

One difference in screen appearance is that with Looking Glass, you are presented with the home directory when you boot up the system. On X.desktop, the user sees the desktop as he left it.

In its current version, X.desktop's Help capabilities are easy to use. The user simply clicks an icon to pull up a dialogue box. Version 3.0, due out in January, will offer context-sensitive Help with graphics.

Visix says Looking Glass Version 2, due out next month, will offer a context-sensitive, hypertext-based Help system accessible via a hot key. Besides Help functions, the new version will also provide a "tree view" of the file system and the ability to save specific desktop layouts by name.

Where the products differ is in their customization abilities and techniques. On Looking Glass, users can specify their preferences and options to a very detailed degree. For instance, it has an interactive window proportion and color-setting facility as well as an integrated icon editor for those who require extra customization for the more than 450 icons supplied.

All customization can be performed by the end user because it is interactive, with the system offering prompts and users responding by clicking on an icon. First-time users should be able to use the product without customization after reading the user's manual.

The degree to which you can customize X.desktop, however, is more comprehensive than Looking Glass. Far beyond customizing icons, it allows you to assign a text editor, such as Microsoft Word or Wordperfect from Wordperfect Corp., to each of your files. You can also set up the system to execute a string of commands simply by clicking on an icon.

It would be up to a programmer or a very experienced user to go into the rule files to make these types of changes.

Configuration is also more complex on X.desktop. In fact, Looking Glass comes only with a user's guide, while X.desktop also supplies a configuration guide. Both

companies say their products are ready to run when delivered.

Although the customizing needs to be done by someone other than the typical end user, the result is a simpler looking system. Whereas Looking Glass at first glance appears to be the more sophisticated of the two products, IXI's design philosophy seems to be "keep it simple."

X.desktop's interface is targeted at less sophisticated users who want to work with an easy-to-use, Macintosh-style graphical representation of a desktop. Looking Glass may have more appeal for the Unix power user or system administrator.

Looking Glass is bundled with Pyramid Technology Corp.'s file servers and will run on workstations from Data General Corp., Intergraph Corp., Starent Computer, Inc., Motorola, Inc. and Sequent Computer Systems, Inc. as well as Intel Corp. 80386-based PCs under Interactive Systems Corp.'s 386/IX.

X.desktop is bundled with The Santa

Cruz Operation's Open Desktop, the IBM RISC System/6000 and Personal System/2 with AIX as well as workstations from Unisys Corp., Motorola, NCR Corp., Tektronix, Inc., NEC Technologies, Inc., Panasonic Co. and Dell Computer Corp.

Both products run on all popular workstations from Sun, Digital Equipment Corp., Hewlett-Packard Co.'s Apollo Division, Mips Computer Systems, Inc. and Sony Microsystems Co.

Looking Glass costs from \$595 to \$1,295, depending on the type of platform, plus about \$300 per user. Annual maintenance fees run \$99 per user and include a toll-free number for phone support.

X.desktop costs \$495 for a single user, regardless of the type of platform. Prices drop when ordering licenses in quantity. An annual support contract costs about 15% of the license fee and includes hot line support via facsimile, electronic mail or telephone as well as free product upgrades and technical bulletins. •

Bring on the GUIs

There are as many as three layers between the user and operating systems when you use a graphical user interface

Unix without a GUI

User
User shell (sh, csh, ksh)
Unix

Unix with a GUI

User
User GUI (Looking Glass, X.desktop)
Underlying GUI (Motif, Open Look)
Window manager (X Windows)
Unix

platforms with a "look and feel" that allow developers to write software for them. This software then uses the built-in functions provided by the underlying interfaces to handle such things as screen and mouse interfacing.

Several developers have taken this one step further, writing a user-oriented — rather than programmer-oriented — graphical interface to Unix that utilizes the facilities of one or more of these underlying graphical interfaces. Such programs might be termed "user GUIs" to distinguish them from the lower level interfaces such as Motif and Open Look (see chart).

While there have been a number of menu systems and friendly front ends available for Unix over the years, they were intended for ordinary character-based terminals rather than workstations.

The new graphical user interfaces are few in number and specifically intended for workstations or personal computers running high-resolution workstation software. Two leading examples are Looking Glass from Visix Software, Inc. in Reston, Va., and X.desktop from IXI Ltd. in Cambridge, UK.

Both products are Motif-compliant and adhere to Posix, OSF and X/Open stan-

Fiedler is the executive producer of "Unix Video Quarterly," a video industry newsletter based in Rescue, Calif.

How to fit the new kid into the old systems environment

BY DENNIS LINNELL

What happens when you install a Unix system in the middle of an existing setup? Consider the following scenarios:

- A retail store switches to a Unix environment but would like to continue using certain MS-DOS applications, such as a spreadsheet for its financial analysis.
- At a hotel, DOS-based personal computers at the check-in counter are connected on a local-area network to a Unix-based midrange system. Throughout a working day, front desk staff members need to access files residing on the midrange processor.
- Economists working at a brokerage firm need to access data stored on an IBM mainframe from the Unix-based workstations on their desktops.

Not too long ago, this type of connectivity problem would have sent customers back to the software developer. Today, however, new categories of products are allowing corporations to pursue their own strategies to fit Unix in with existing operating systems, such as MS-DOS, VAX/VMS, MVS and VM.

There are two common scenarios in which companies need to integrate Unix with another operating system. In the simpler case, a user wants to run MS-DOS-based applications on his Unix-based workstation. For these people, there is DOS emulation software.

Things get more complicated when the workstation or PC user needs to access data from a host computer across a LAN. These people need to look into terminal emulation, file transfer or file-sharing techniques.

DOS emulation

Virtual emulation software loaded on a Unix computer creates a "virtual machine" within the system, allowing it to run DOS-based applications. There are two different types of this software: packages that operate independently and software that needs to interact with the virtual machine hardware built into Intel Corp. 80386 and I486 chips.

With the latter type of software, the microprocessor is put into "virtual 8086" mode, so instead of using the addressing scheme found on a workstation, the application uses the same 1M-byte range found on a PC.

Nevertheless, both products on the market today — VP/ix from Interactive Systems Corp. in Santa Monica, Calif., and Merge 386 from Locus Computing Corp. in Inglewood, Calif. — take advantage of Unix's virtual memory and paging. In addition, Unix memory management and scheduling features remain unchanged. In fact, DOS applications never see any of the Unix features, and Unix applications are unaffected by the DOS emulator.

While software-only products require that no changes need to be made to the Unix kernel, both VP/ix and Merge 386 require a few tweaks to the operating system to make it aware of the 386-based chip. However, operating system overhead is kept to a minimum, and system stability is unaffected.

To emulate the PC's I/O hardware, VP/ix provides a full set of BIOS functions, which translates most I/O requests into equivalent Unix system calls. DOS-based applications can transparently share files and I/O devices with Unix applications.

Interactive and Locus sell their products to hardware vendors on an OEM basis. An obvious drawback to the virtual machine strategy is that many Unix-based workstations — including those marketed by Digital Equipment Corp., Silicon Graphics, Inc. and Sun Microsystems, Inc. — use reduced instruction set computing (RISC) chips, which do not emulate the Intel 8086 microprocessor.

Linnell is president of Gate Technology, Inc., a consulting firm in McLean, Va.

Some hardware vendors fix this problem by providing a suitable Intel microprocessor as a coprocessor or emulating Intel 8086 instructions in software running on the Unix system. For example, Sun's Sun IPC provides an Intel coprocessor on a circuit board, allowing many users to access it through a network.

While this is a workable solution, it is also an expensive one: The add-on boards can cost thousands of dollars.

A second approach is to choose software that emulates both the Intel 8086 and DOS. An example is Soft PC from Sunnyvale, Calif.-based Insignia Solutions, which also markets its product to hardware vendors on an OEM basis.

Although this software is inexpensive, it also delivers slower performance than the virtual machine strategy. For instance, workstations with a microprocessor equivalent to the Motorola Corp. 68030 provide performance equivalent to that of an IBM Personal Computer AT.

Terminal emulation

You can run terminal emulation software on a Unix machine to access a non-Unix system or you can run it on a PC to access a Unix machine. Either way, this software, which costs about \$500 for Unix and \$100 on a PC, allows incompatible systems to communicate by making one computer appear like a group of compatible terminals to another computer.

Terminal emulation software runs as a process in the Unix system and provides functions comparable with terminal emulators for PCs, such as Procomm Plus from Datastorm Technologies in Columbia, Mo.

The most common terminals emulated are asynchronous — including the DEC VT100 and IBM 3101 — but the synchronous IBM 3270 is popular as well.

It uses both IBM's Systems Network Architecture (SNA) and binary synchronous (bisynch) protocols. While SNA is more popular and up-to-date, many Unix systems still support bisynch protocols.

Terminal emulators connect to a host computer in two major ways. Most use the EIA-232 (previously called RS-232) interface to connect to modems. These modems hook up to conventional telephone circuits, which physically link the systems together.

A newer type of connectivity involves using a LAN, such as Ethernet or token-ring. This provides higher speeds but shorter distances than modems.

Most terminal emulators can also perform file transfers using either Xmodem, Kermit or 3270-based file transfer using IBM's IND\$FILE protocol.

Regardless of protocol, such file transfers have significant drawbacks. Transferring many files can be time-consuming and tedious. The entire process is potentially error-prone, and recovery can be difficult.

File transfer via TCP/IP

With Transmission Control Protocol/Internet Protocol (TCP/IP), file transfer is greatly simplified. Not only do most Unix systems attach to networks that use this protocol, but TCP/IP provides its own terminal emulation through two sets of protocols — Telnet, which emulates asynchronous terminals, and TN3270, which supports 3270-style terminals.

TCP/IP also has a file-transfer protocol, called FTP, which sends entire files across the TCP/IP network. Nearly all Unix operating systems, such as IBM's AIX for the RISC System/6000 computer family, provide these protocols.

TCP/IP operates on practically every vendor's computers. For example, IBM's TCP/IP for MVS software product enables the largest mainframes to communicate with Unix systems via TCP/IP. This lets Unix users exchange files with and access applications on the MVS system. TCP/IP operates concurrently with the customer's SNA communication network; Unix does not disrupt existing production work.

Several vendors have implemented TCP/IP under DOS on the PC. PC/TCP from FTP Software in Cambridge, Mass., is a typical product. It provides many functions not offered in terminal emulation products. For example, it lets the PC operate as a network server or client.

With the PC as a server, clients on the Unix system can request files to be transferred to or from the PC. Unix users can send output to a printer on the PC. PC/TCP also has an electronic mail package, so PC users can exchange mail with users on the Unix system or anywhere else on the network.

File-sharing

The closest integration achievable — as well as the most complex and expensive — is file-sharing via Sun's Network File System (NFS), a network software package that uses the services of TCP/IP. With file-sharing, users get not only a

VIRTUAL EMULATION software loaded on a Unix computer creates a "virtual machine" within the system, allowing it to run DOS-based applications.

copy of a file but the file itself.

NFS uses TCP/IP to allow users to access files and I/O devices on a remote system and never know it; it is as transparent as if they were on their own systems. In essence, NFS provides virtual disks.

The file from the remote system appears as an extension of the local file system. For example, if a PC user wants to load a Unix file into its word processor, the file appears as though it were on drive D on the PC.

NFS also provides remote printing and command execution. A PC user can print on the Unix system by simply directing the PC's LPT2: Output to NFS. The user can tell the system to run programs or utilities on the Unix system and send the results back to the PC. These same options are available between mainframe systems and Unix.

These options for integrating Unix — which are expanding almost daily — also work well in combination. In a sophisticated setup, a PC user connected to a Unix system could log on to a VAX using a terminal emulator and simultaneously access the Unix system's files using NFS. The same user can have sessions with the mainframe using TN3270. Other users with asynchronous terminals can run Lotus Development Corp.'s 1-2-3 spreadsheet using VP/IX on Unix. •

ASK THE VENDOR

We are currently connecting our server running Xenix to our Novell network using Atlantix's Comet. We are planning to move to a Unix environment and would like to know how we can accomplish this move while still maintaining the systems we are now using.

Chris McMorrow
Director of MIS
Hotelecopy
Miami, Fla.

Gregory Johnson
Attorney at Law
Owner/Operator
Law Office Management Services
Seattle, Wash.

ATLANTIX CORP.: Atlantix's new interoperability product, Atlantix Access, provides transparent access among Unix, Novell, IBM LAN Manager and Transmission Control Protocol/Internet Protocol-NFS networks. Atlantix Access also interoperates with Atlantix ConcoNet on Xenix systems. By simply installing Atlantix on any standard personal computer running SCO Unix, you will have access to Unix, Xenix and Novell files as well as applications across all systems, with no necessary change to the current environment.

Additionally, Atlantix Windowview will allow DOS-based Windows users to access applications across all systems simultaneously from DOS workstations.

ZYLAB CORP.: The look and feel of Zyindex for Unix is different from the DOS product, but it is still quite easy to use.

Both versions of the text retrieval system allow users to employ a range of search techniques, including Boolean, proximity, wild-card and synonym searching.

Numeric and date-range searches are also available.

New design features for Unix include drop-down menus, dialogue boxes and concurrent displays of multiple queries. New search features include a query history, an interactive dictionary of searchable terms and a clipboard for pasting new queries from retrieved data.

IBM invites you to take a test run.

Announcing Early Test Programs for MVS/ESA SP 4.1 and 4.2, VM/ESA and VSE/ESA.

If you're a software vendor, here's a great opportunity to see that your application runs on our new versions of announced software before they become generally available.

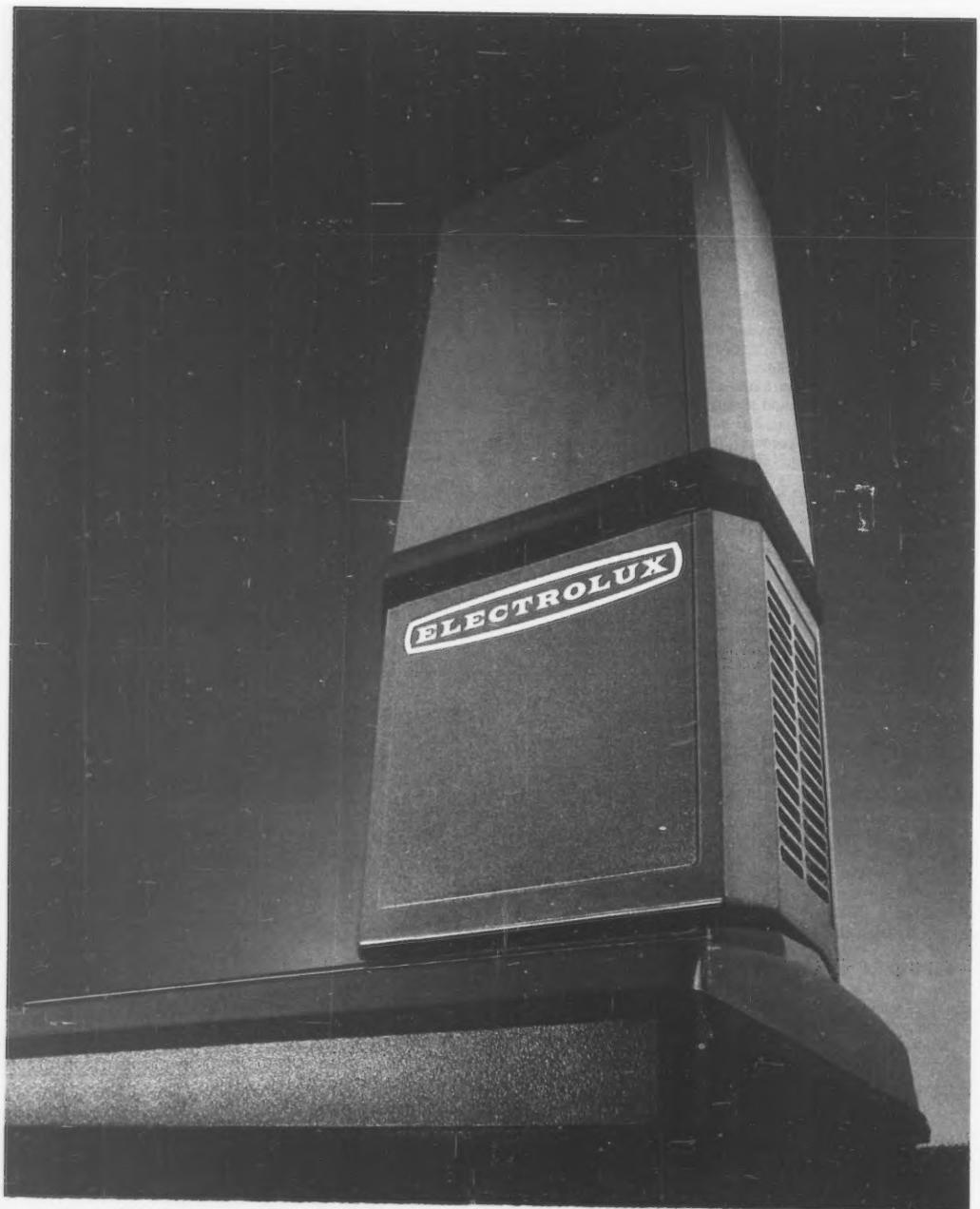
Enroll in our Early Test Programs, and you'll receive not only inexpensive test time — via the IBM Information Network — but important documentation and technical support as well.

To sign up, or for further details, call 1-800-627-8363. See what the future has to offer. Today.



© 1990 IBM Corporation. IBM is a registered trademark and MVS/ESA, VM/ESA and VSE/ESA are trademarks of IBM Corp.

ELECTROLUX CHOSE NETWARE TO FROM OPERATING



©1990 Novell Inc.

HELP KEEP ITS SALES OFFICES IN A VACUUM.

When Electrolux corporate management needed to share information with 600 sales offices, they chose the cleanest network solution they could find.

"Our management team was isolated from critical sales figures. And we needed a one-keyboard solution for several computing environments," says Brian Skelton, senior networking programmer/analyst.

That's when America's premier floor care company chose NetWare®, the only PC-based network operating system that's in its eighth generation. "We chose NetWare because it's a proven, flexible network solution," recalls Skelton.

In addition to sharing information, NetWare allows Electrolux to share expensive software. In fact, NetWare is compatible with thousands of PC-based applications. And since NetWare is hardware independent, there's no fear of hardware incompatibility or obsolescence.

Skelton puts it this way, "NetWare is the network of choice because compatibility with other products is built in. It gives us an open platform to connect multiple workstations, and the flexibility to choose many routes for network integration."

In just three years, Electrolux has automated from six standalone PCs to an

integrated business-wide network with mainframe connectivity, remote access and a workstation on every desktop. And Novell has helped meet its growing MIS needs with solutions and support that only the responsible leader in network innovation can provide.

Call 1-800-LANKIND for your 1990 NetWare Buyer's Guide. And learn more about how NetWare cleared the way for a business-wide network at Electrolux.



The Past, Present, and Future
of Network Computing.

Terminal emulation for Unix integration

VENDOR	PRODUCT	EMULATION PROVIDED ¹	UNIX VERSION SUPPORTED	HARDWARE PLATFORM	TERMINAL EMULATION	OPERATES ACROSS WHICH LOCAL-AREA NETWORK	MEMORY REQUIREMENTS (BYTES)	FILE-TRANSFER PROTOCOLS SUPPORTED	WINDOW/ENVIRONMENTS SUPPORTED	MAXIMUM NUMBER OF SESSIONS/VIEWING METHODS	USER-DEFINABLE KEYBOARD MAPPING	MAXIMUM MODEM SPEED SUPPORTED	HIGH-LEVEL LANGUAGE PROGRAMMING APPLICATION SUPPORT	PRICE
Active Ingredients, Inc. (817) 576-2000	Communicae	Unix to DOS, Unix, VMS	MACH	Next	DEC VT100, VT220, Tektronix 4010, 4014	Ethernet, TCP/IP	Less than 200R	Kermit, Xmodem, Ymodem	Next	1	Yes	19.2K	No	\$395
Apple Computer, Inc. (408) 996-1010	MacTerminal Version 3.0	Macintosh to Unix, VMS	NP	Macintosh Plus, or later	DEC VT102, VT320, TTY	Appletalk	1M	ASCII, Xmodem, Ymodem Text, proprietary	Macintosh	Varies/Menus	No	57.6K	No	\$125
Beane & Whiteside Software Ltd. (415) 648-6558	BWTEL	DOS to Unix, VMS	All versions	IBM PCs and compatibles with Ethernet adapters	DEC VT52, VT100	Ethernet, TCP/IP	128K	FTP, NFS, Kermit, Xmodem, TFTP	MS Windows 3.0	8/window, hot key	Yes	19.2K	No	\$195
The Bristol Group Ltd. (603) 437-3700	IsoTerm	Unix to VMS	AIX, Domain OS, SunOS	Apollo, IBM RS/6000, Sun	DEC VT340	Decnet, TCP/IP	1M	None	Sunview, Apollo Display Manager, OSF Motif	NP/window	Yes	All	Yes	\$600
	IsoTek	Unix to VMS	Domain OS, SunOS	Apollo workstations, Sun	Tektronix 4000, 4100, 4200 series	Decnet, TCP/IP	2M	None	Sunview, Apollo Display Manager	NP/window	Yes	All	Yes	\$3,990
Century Software (801) 268-3068	Term	DOS to Unix, Unix to DOS	Unix System V Release 2, 3, SCO Unix, Xenix, System III, Berkeley 4.0	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100/102, VT220, Wyse 50, 60, SCO Color Console, Adm1, TeleVideo 912, 925, TTY	None	512K	Kermit, Xmodem, Ymodem, Modem?, WtermCRC, TermCRC	MS Windows 2.1, 3.0, X Windows	1	Yes	37.9K	Yes	\$195 (DOS), \$495 (Unix)
	TermNet	DOS to Unix, Unix to DOS	NP	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100/102, VT220, Wyse 50, 60, SCO Color Console, Adm1, TeleVideo 912, 925, TTY	Most major networks	512K	Kermit, Xmodem, Ymodem, Modem?, WtermCRC, TermCRC	NP	101/hot key	Yes	37.9K	Yes	\$695
	Term for X Windows	DOS to Unix, Unix to DOS	NP	Over 150 hardware platforms	ANSI 3.64, DEC VT52, VT100, VT220, VT320, VT420, Sun PC-NFS, Ungermann-Bass, Int'l 14, TeleVideo 912, 925, TTY	NA	640K	Kermit, Xmodem, Ymodem, Modem?, WtermCRC, TermCRC	X Windows	11/window	Yes	37.9K	Yes	\$695
Coefficient Systems Corp. (212) 777-6707	Coterm	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT52, VT100, VT220, VT320, VT420; Tektronix 4010, 4014	Banyan, 3Com, Novell, Ungermann-Bass, Int'l 14	320K	ASCII, Kermit, Xmodem, Vtrans	NP	1	Yes	19.2K	NP	\$195-\$329
Concept Omega Corp. (908) 560-1377	Thoroughbred terminal emulator	DOS to Unix, VMS	Unix System V, Release 3 and higher	IBM PC XT's, AT's and compatibles	Wyse 50, 60	None	10K	None	Any that Wyse 50 or 60 can support	1	No	19.2K	Yes	\$195
CMI (603) 448-5193	MLINK	DOS to Unix, Unix to DOS	Unix System V, BSD Unix, Xenix, AIX	IBM PCs and compatibles	Altos III, AT&T 605, DEC PC/TCP, Novell, Sun PC-NFS, Ungermann-Bass, TeleVideo 910, 925, 950, Wyse 50, SCO ANSI console	NP	163K	Kermit, Xmodem, CRC, Xmodem 1, proprietary	None	1	Yes	38.4K	Yes	\$195-\$250
Datanetics (412) 363-3282	DataLator	Unix to DOS	NP	IBM PCs and compatibles	TeleVideo 905, Wyse 50	Novell	256K	Open architecture, programming hooks available	None	1	Yes	9.6K	No	\$150
Digiboard, Inc. (612) 922-8055	Double View	DOS to Unix, Unix to DOS	All versions	IBM PC XT's, AT's and compatibles; Personal System/2s	DEC VT100, VT200, SCO ANSI console, Interactive AT/3, Wyse 50	None	64K	Proprietary enhanced version of Kermit	None	7/hot key	Yes	38.4K	No	\$239 (8 users)
Diversified Computer Systems, Inc. (303) 447-9251	EM 320	DOS to Unix, VMS	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT52, VT100/102, VT220, VT320	Decnet, Excalan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	170K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$189
	EM 4010	DOS to Unix, VMS	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT52, VT100/102, VT220, VT320, VT640, Tektronix 4010, 4014	Decnet, Excalan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	220K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$249
	EM 4105	DOS to Unix, VME	All versions	IBM PC AT's, PS/2s and compatibles	DEC VT52, VT100/102, VT220, VT320, VT640, Tektronix 4107, 4105, 4010, 4014	Decnet, Excalan, FTP PC/TCP, Novell, 3Com, Sun PC-NFS, Ungermann-Bass, Wollongong	260K	ASCII, Kermit, Xmodem	Desqview, MS Windows 3.0	8/hot key	Yes	9.6K	Yes	\$359
Eicon Technology Corp. (514) 631-2592	Access/X.25	DOS to Unix	NP	IBM PCs, PS/2s and compatibles with Econ card	DEC VT52, VT100, TTY	Any Netbios LAN, Novell Network	100K	ASCII, proprietary	None	9/hot key	Yes	NP	No	\$1,095 (software and hardware)
FTG Data Systems (714) 995-3900	EMU-TEK 4025	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	Tektronix 4025	None	265K	None	None	1	No	19.2K	No	\$795
	EMU-TEK 4200 Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4010, 4014, 4105, 4107, 4207, 4208	DEC PCSA, Ungermann-Bass, Net/One, Novell Netware for VMS, VMS/PC/ACS, IBM LAN ACS, FTP PC/TCP	512K-640K	Kermit, Xmodem	None	6/menu	Yes	38.4K	No	\$950

¹Ties between other environments available.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

How Long
Will You Have
To Wait For
VSE/ESA
Software
Solutions?

UNIX ON THE DESKTOP

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	EMULATION PROVIDED ¹	UNIX VERSION SUPPORTED	HARDWARE PLATFORM	TERMINAL EMULATION	OPERATES ACROSS WHICH LOCAL-AREA NETWORK	MEMORY REQUIREMENTS (BYTES)	FILE-TRANSFER PROTOCOLS SUPPORTED	WINDOW/ENVIRONMENTS SUPPORTED	MAXIMUM NUMBER OF SESSIONS/VIEWING METHODS	USER-DEFINABLE KEYBOARD MAPPING	MAXIMUM MODEM SPEED SUPPORTED	HIGH-LEVEL LANGUAGE PROGRAMMING APPLICATION SUPPORT	PRICE
FTG Data Systems (TLA) 986-3860	EMU-TEK Five Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4014, 4105, 4115	DEC PCSA, Unigrafx-Basis, Net/One, Novell Netware for VMS, Novell NACS, IBM LAN ACS, FTP, P/TCP	512K	Kermit, Xmodem	None	6/menus	Yes	38.4K	No	\$495
	EMU-TEK Seven Plus	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4014, 4105, 4107, 4010	None	512K-640K	ASCII, Binary	None	1	Yes	38.4K	No	\$695
	EMU-TEK Level 1	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Tektronix 4010, 4014	None	256K	ASCII, Binary	None	1	Yes	19.2K	No	\$95
	EMU-TEK Level 2	DOS to Unix	All versions	IBM PCs, PS/2s and compatibles	DEC VT100, Digital Engineering VT540, Tektronix 4010, 4014	None	256K	ASCII, Binary	None	1	Yes	19.2K	No	\$295
	PC/TCP	DOS to Unix, Ultrix, Xenix	NP	IBM PCs and compatibles	DEC VT220	TCP/IP	512K	Proprietary FTP, RCP	MS Windows 3.0	10/window	Yes	9.6K	No	\$400
Greditsoft (408) 446-1919	TGraf series	DOS to Unix	NP	IBM PCs, PS/2s and compatibles	DEC VT52, VT100, VT200; Tektronix 4105, 4107, 4207, 4115	Most major networks	200K	Kermit, Xmodem, DOS	Windows	Limited by memory only/window	Yes	Hardware-dependent	Yes	\$195-\$1,995
	TGraf-32 Mac	Macintosh to Unix	NP	Macintosh II series	DEC VT 52, VT100, Tektronix 4107	TCP/IP	1M	Kermit	Multifinder	Same as above	Yes	Hardware-dependent	Yes	\$995
H&A Computer Services, Inc. (415) 434-3517 (800) 654-3215	PCXVT100	DOS to Unix, Unix to DOS	All versions	IBM PC ATs and compatibles	DEC VT52, VT100	None	90K	Proprietary	None	1	Yes	9.6K	Yes	\$59
	Adacomputer	DOS to Unix, Unix to DOS, Macintosh to Unix, Unix to Macintosh	All versions, HPUX file transfer	IBM PC ATs, PS/2s and compatibles, Macintosh	DEC VT100, HP 2392, 2393, 2627, 700/94	HP OfficeShare, LAN Manager, 3Com LAN Manager	270K-640K (MS Windows), 200K (Macintosh)	Proprietary Xmodem	Macintosh, HP New Wave, MS Windows	Limited by memory only/window	No	19.2K	No	\$299
Hilgraeve, Inc. (313) 243-0576 (800) 526-2760	Hyper Access/5	DOS to Unix	NP	IBM PC ATs, Intel 80386-based machines	DEC VT100/102, 220, 320; Televideo 925, 950	None	350K	ASCII, Hyper-protocol, Kermit, Xmodem, Ymodem, Zmodem, Ymodem batch	DOS windows, OS/2 windows	8 (DOS), Unlimited (OS/2)/window	Yes	114.2K	No	\$199
Houston Computer Services, Inc. (713) 493-9900	Octacomm/PC	DOS to Unix	Unix System V and most other versions	IBM PCs, PS/2s and compatibles	DEC VT100, Texas Instruments 931	None	256K	Character Mode	MS Windows, OS/2 Presentation Manager	1	No	19.2K	No	\$125
Hummingbird Communications Ltd. (416) 470-1203	HCL-Exceed, Exceed Plus, Exceed Plus 8514A, Extend	DOS to Unix, Unix to DOS	All versions	IBM PC ATs, PS/2s, Intel 80286-, 80386-, 1486-based PCs	X terminals	TCP/IP	640K-1.64M	Proprietary	X Windows	1 (DOS), 32/window, hot key	Yes	NA	NA	\$495-\$595
James River Group, Inc. (813) 329-2221	Ice-TCP	DOS to Unix	Unix System V	IBM PCs and compatibles	ANSI, AT&T 605, DEC VT100, VT220, Wyse 60	Arctech, Ethernet, Starlan, token-ring	220K	Xmodem, Ymodem	None	1	Yes	38.4K	No	\$195 (per DOS PC)
	Ice-Ten	DOS to Unix	Unix System V	IBM PCs and compatibles	ANSI, AT&T 605, DEC VT100, VT220, VT240, VT241, VT340; Tektronix 4010, 4014	None	45K	Xmodem, Ymodem	None	4/hot key	Yes	38.4K	No	\$295 (per Unix host)
JYACC, Inc. (212) 267-7722	Jterm	DOS to Unix	All versions	IBM PCs and compatibles	DEC VT100, VT220, TTY, proprietary	NF	256K	ASCII, Kermit, Kerm server, Xmodem, Ymodem, proprietary Jtran	None	1	Yes	192K	NA	\$175
KEA Systems Ltd. (800) 431-9727	Zetem 240	DOS to Unix, Unix to VMS	Interactive 386/486, SCO Unix System V/38	Intel 80386 or 1486-based machines	DEC VT52, VT100, VT220, VT240, VT241; VT340; Tektronix 4010, 4014	Novell, LAT, TCP/IP	256K	ASCII, Kermit, Xmodem, Ymodem	None	4/hot key, network	Yes	9.6K	No	\$295
Microlab, Inc. (402) 483-7747	Chitchat	DOS to Unix	SCO Xenix, SCO Unix	IBM PCs and compatibles	ANSI	Mainlan	35K	None	Desqview	2/window	No	2.4K	No	\$79.95
Pacer Software, Inc. (819) 454-0588	PacerLink	DOS to Unix, Unix to DOS, Macintosh to/from Unix	Unix System V, Release 4.3 RSD	Apollo, DEC, Data General, Harris, HP, Interactive, Mips, Motorola, NCR, Sun	Adds 60; DEC VT100, VT220, VT240, VT241; Data General 320; Televideo 950; TTY	TCP/IP	512K	Telnet proprietary	Macintosh	5-500/window, PC uses split screen	Yes	19.2K	Yes	\$1,200 (five-user license)
Pericom, Inc. (800) 893-6404	TeemX 07, TeemX 340	POS to Unix	AIX, Ultrix	Decstation, IBM RS/6000 Sun Microsystems 3, 4	DEC VT100, VT220, VT340, VT640; Data General D200; Tektronix 4105, 4207, 4211	Ethernet	NP	FTP	NP	NP	Yes	38.4K	NP	\$800
Polycom, Inc. (314) 432-4142	Poly-Com/320	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT220, VT320	AT&T Stargroup, 3Com, Banyan Vines, Novell	256K	Kermit, XFR plus	None	1	Yes	9.6K	No	\$199
	Poly-Com/240	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT240, VT241	AT&T Stargroup, 3Com, Banyan Vines, Novell	256K	Kermit, XFR plus	None	1	Yes	9.6K	No	\$299
	Poly-Star/T	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT52, VT100, VT220, VT320; Tektronix 4010, 4014	AT&T Stargroup, 3Com, Banyan Vines, Novell	280K-375K	Kermit, XFR plus	MS Windows 3.0	20/window	Yes	19.2K	Yes	\$229
	Poly-Star/G	DOS to Unix, Ultrix, VMS	NP	IBM PC XTs, ATs, PS/2s and compatibles	DEC VT240, VT241, VT330, VT340; Tektronix 4010, 4014	AT&T Stargroup, 3Com, Banyan Vines, Novell	280K-375K	Kermit, XFR plus	MS Windows 3.0	20/window	Yes	19.2K	Yes	\$329

Now, That Didn't Take Long Did It.

**COMPUTER
ASSOCIATES**

News

COMPUTER ASSOCIATES INTERNATIONAL, INC.
711 Stewart Avenue Garden City, NY 11530-4787
Telephone (516) 227-3300 Telex 981393 FAX (516) 227-3937

Contact: Chris Maynard
Corporate Communications
(516) 227-3300, Ext. 7129

ALL COMPUTER ASSOCIATES VSE SOFTWARE SUPPORTS IBM VSE/ESA

Garden City, New York -- September 5, 1990 -- COMPUTER ASSOCIATES INTERNATIONAL, INC. announced today complete support for IBM's recently announced VSE/ESA Operating System concurrent with its general availability. Computer Associates, the acknowledged experts in VSE technology, has been committed to the VSE operating system since the company was founded in 1976. With over 20,000 VSE software product licenses worldwide, Computer Associates is the leading independent vendor of VSE software today. A list of the products supporting VSE/ESA follows:

SYSTEMS MANAGEMENT SOFTWARE

- CA-DYNAM/D
- CA-DYNAM/FI
- CA-DYNAM/T
- CA-ASM/ARCHIVE
- CA-SORT
- CA-CICSPORT
- CA-SPACE/MANAGER
- CA-TAPE/MANAGER
- CA-ACF2
- CA-TOPSECRET
- CA-JARS
- CA-JARS/CICS
- CA-JARS/IDMS
- CA-ACTIVATOR II
- CA-CONVERTOR
- CA-NETMAN
- CA-RAPS
- CA-DRIVER
- CA-SCHEDULER
- CA-SYSTEM SCHEDULER
- CA-EARL
- CA-EZTEST/CICS
- CA-VOLLIE
- CA-FLEXISCREEN
- CA-LOOK
- CA-OPTIMIZER
- CA-PROMACS

(more)

INFORMATION MANAGEMENT SOFTWARE

- CA-DATACOM/DB
- CA-DATACOM/TOTAL Transparency
- CA-DATACOM/VSAM Transparency
- CA-DATACOM/DL1 Transparency
- CA-DATADICTONARY CA-DATAQUERY
- CA-DB: STAR CA-IDMS/DB
- CA-IDMS/DC CA-IDMS/DDS
- CA-IDMS/DEVELOPER CA-IDMS DBA
- CA-ESCAPE CA-eMAIL
- CA-ETC CA-ADS
- CA-ADS/GENERATOR CA-CULPRIT
- CA-DATAMACS/II CA-ICMS
- CA-IDEAL CA-LIBRARIAN
- CA-MetaCOBOL+ CA-OLQ

(more)

BUSINESS APPLICATION SOFTWARE

Manufacturing:

- CA-CAS: BOM
- CA-CAS: CCC
- CA-CAS: COE
- CA-CAS: INV
- CA-CAS: MPS
- CA-CAS: AP
- CA-CAS: AR
- CA-CAS: FA
- CA-CAS: GL

Human Resources:

- CA-HRS: Payroll
- CA-HRS: Personnel
- CA-HRS: Position Tracking
- CA-HRS: Applicant Tracking

Banking:

- CA-INFOPOINT: Combined Interest Reporting
- CA-INFOPOINT: Deposits
- CA-INFOPOINT: Integrated Commercial Loans
- CA-INFOPOINT: Cashtran
- Masterpiece Financial:
- CA-ACCOUNTS PAYABLE
- CA-ACCOUNTS RECEIVABLE
- CA-GENERAL LEDGER/FRS
- CA-FIXED ASSETS

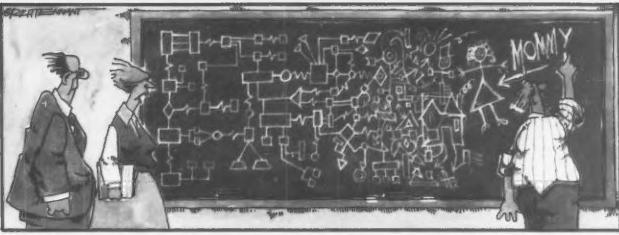
(more)

**COMPUTER
ASSOCIATES**
Software superior by design

UNIX ON THE DESKTOP

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	EMULATION PROVIDED ¹	UNIX VERSION SUPPORTED	HARDWARE PLATFORM	TERMINAL EMULATION	OPERATES ACROSS WHICH LOCAL-AREA NETWORK	MEMORY REQUIREMENTS (BYTES)	FILE-TRANSFER PROTOCOLS SUPPORTED	WINDOW ENVIRONMENTS SUPPORTED	MAXIMUM NUMBER OF SESSIONS/VIEWING METHODS	USER-DEFINABLE KEYBOARD MAPPING	MAXIMUM MODEM SPEED SUPPORTED	HIGH-LEVEL LANGUAGE PROGRAMMING APPLICATION SUPPORT	PRICE
Kensington Software, Inc. (503) 624-0360	MacQT	Macintosh to Unix, Macintosh to NCR ITX	All versions	All Macintosh	ADDS Viewpoint, ANSI, DEC VT100, NCR 7900, Wyse 50	Macintosh	256K	ASCII, Kermit	Macintosh	1	Yes	19.2K	No	\$200
	ANZ10	DOS to Unix, NCR ITX	All versions	IBM PCs and compatibles	ADDS Viewpoint, ANSI, DEC VT100, NCR 7900, Wyse 50	None	170K	ASCII, Kermit	Desqview	1	Yes	19.2K	No	\$395
Scientific Endeavors Corp. (615) 376-4146	VTEK	DOS to Unix	NP	IBM PC XT's, AT's, PS/2s and compatibles	DEC VT52, VT100/102, Tektronix 4010, 4014, 4105	None	256K	Kermit, Xmodem	NP	1	Yes	38.4K	No	\$195
Softel, Inc. (516) 324-1306	PC52	DOS to Unix, Unix to DOS	Unix System V, Release 3	AT&T 6300 series, IBM PCs and compatibles, Zenith laptop	DEC VT52	Starline, X.25 (via 3Com Systems Ltd. hardware)	128K	ASCII	None	2/function key	Yes	56K	No	\$30
Softkline (904) 878-8564	Mirror III Version 2.0	DOS to Unix	NP	IBM PCs and compatibles	ADDS Viewpoint: ANSI, DEC VT100, VT52, VT100/101, VT220, Honeywell VIP 7200, 7205, Televideo 912, 920C, 925, 950; Texas Instruments 940; Lynxnet 78; Wang Wyse 50, 229	None	185K-480K	ASCII, Computer-8, CrossTalk, Hayes, Kermit, Kermit server, Xmodem batch, Xmodem 1K, Ymodem, Ymodem-G, Zmodem	NP	1	Yes	300-38.4K	Yes	\$149
Structured Software Solutions, Inc. (314) 985-9993	Pace!PC, Pace!Term	DOS to Unix, Unix to DOS	Unix System V, Xenix	IBM PC XT's, AT's, PS/2s and compatibles	DEC VT100, 220	None	240K (DOS)	Xmodem	None	10/window	Yes	38.4K	No	\$150
Telexpress, Inc. (609) 877-4900	Teleterm-EM	DOS to Unix, Unix to DOS	All versions	Intel 80286-, 80386-, 1486-based machines	ANSI, DEC VT100, VT220, Wyse 60	None	256K	ASCII, Kermit, Xmodem	NP	1	Yes	19.2K	No	\$192
Tessellate Software Corp. (714) 968-7746	TE Works	DOS to Unix	Unix System V, SCO Unix, Xenix, HPUX, VMS	IBM PCs and compatibles	ANSI, DEC VT100/102, VT220, TTY	Netbios, Starline, token-ring	256K	ANSI, Kermit, Xmodem, proprietary	None	2/function key	Yes	19.2K	Yes	\$99, \$145 (LAN version)
	Machine	DOS to Unix	Unix System V, SCO Unix, Xenix, HPUX, VMS	Macintosh series	ANSI, DEC VT52, VT100	None	512K	ASCII, proprietary	None	1	Yes	9.6K	Yes	\$145
	PC Works	DOS to Unix	Unix System V, SCO Unix, Xenix, HPUX, VMS	IBM PCs and compatibles	ANSI, DEC VT100/102, VT220, TTY	Netbios, Starline, token-ring	256K	ANSI, Kermit, Xmodem, proprietary	None	2/function key	Yes	19.2K	Yes	\$195
Tymshare Corp. (800) 767-0611	Session for Windows/Session for Macintosh	DOS to Unix, Unix to DOS	All versions of HP/UX	IBM PCs and compatibles, Vectra, Applemac 512 and above	HP2392, HP2393, HP2397, HP700/94	HIP Telnet, Advancenet, VME, X.25, HP ARPA services	1M (Macintosh)	Xmodem, Macintosh, proprietary	MS Windows 2.11, 3.0	1-6/window	No	19.2	Yes	\$299
U.A. Systems, Inc. (714) 968-3792	Step Watcher, UA-LAN	DOS to Unix	All versions	Intel 80286-, 80386-, 1486-based machines, Sun, Motorola	DEC VT100, Epix II, TeleVideo, Wyse 350, proprietary	Novell, Lantastic, token-ring	70K	Proprietary	MS Windows 3.0	2/window	Yes	9.6K	No	\$99
Unisys Corp. Contact local sales office	InfoView II Version 3.4	DOS to Unix	NP	Unisys PWP, IBM PCs and compatibles	ANSI x3.64, Tektronix 4014	Netbios-compatible	512K	None	Proprietary	1	Yes	9.6K	No	\$300
Walker Blicher & Quimby, Inc. (206) 324-0363	Reflection 1, Plus	DOS to Unix, HPUX	All versions	IBM PCs and compatibles	DEC VT102, HP2392A, HP700/92, HP700/94	Advancenet, NetOne, Novell, Starlan, VIM, IBM LAN, RAP, LAT, Telnet	256K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP/UX, VMS	MS Windows	4/function key	Yes	38.4K	Yes	\$299, \$399
	Reflection 2	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT100/102, VT220, VT320	DEC Larworks, PC SA, LAT	90K-200K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/function key	Yes	38.4K	Yes	\$199
	Reflection 2 Plus	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT100/102, VT220, VT320	DEC Larworks, PC SA, LAT, 3Com, Novell Network, Netware for VMS, TCP/IP, Ungermann-Bass	90K-200K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/function key	Yes	38.4K	Yes	\$269
	Reflection 2 Plus for Macintosh	DOS to VMS	All versions	Macintosh 512K enhanced, Plus, SE, II series	DEC VT102, VT220, VT320	Pace!, Alisa, LAT, TCP/IP	410K	Kermit, Xmodem, proprietary	Macintosh	Limited by memory only/Multi-finder	Yes	576K	Yes	\$249
	Reflection 3 Plus	Macintosh to HPUX	All versions	Macintosh 512, 512E, Plus, SE/30, II, IIX, RX	HP2392A	None	256K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP/UX, VMS	MS Windows	4/window	No	57K	No	\$399
	Reflection 4	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT240, VT241, graphic features of DEC VT100/102, VT220, VT320, VT330, VT340; Tektronix 4014	DEC Larworks, PC SA, LAT	200K-360K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/function key	Yes	38.4K	Yes	\$299
	Reflection 4 Plus	DOS to Unix, VMS	All versions	IBM PCs and compatibles	DEC VT240, VT241, graphic features of DEC VT100/102, VT220, VT320, VT330, VT340; Tektronix 4014	DEC Larworks, PC SA, LAT, 3Com, Novell Network, Netware for VMS, TCP/IP, Ungermann-Bass	200K-360K	Kermit, Xmodem, proprietary	MS Windows, Desqview	8/function key	Yes	38.4K	Yes	\$369
	Reflection 7, 7 Plus	DOS to Unix, HPUX	All versions	IBM PCs and compatibles	HP2627, HP2623A, Tektronix 4010	Advancenet, NetOne, Novell, Starlan, VIM, IBM LAN, RAP, LAT, Telnet	384K	Kermit, Xmodem, all host applications written for MPE, Unix, Ultrix, HP/UX, VMS	MS Windows	4/function key	Yes	38.4K	Yes	\$399, \$469
	Reflector Series Software	DOS to Unix, Unix to DOS	All versions	IBM PCs, PS/2s and compatibles	4P2392A, HP2627A, UT220, UT320, UT240/241	PC-NFS, TCP/IP	12K-320K	Kermit, Xmodem, FTP, Unix, proprietary	MS Windows 3.0	4/function key, Session Manager	Yes	19.2K	No	\$199-\$469



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of \$38.95* per year — a savings of 62% off the single
copy price.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: Home Business New Renew Basic Rate: \$48 per year

*U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

(Please specify)

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. User: Other _____

(Please specify)

2. TITLE/FUNCTION (Circle one)

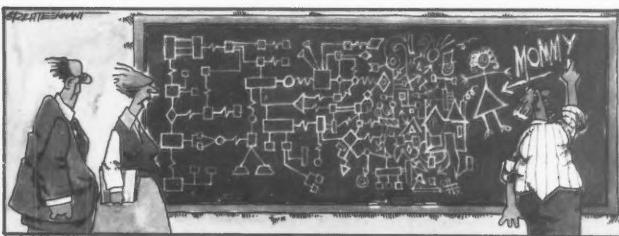
- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21. Dir/Mgr. MIS Services, Information Center
- 22. Dir/Mgr. MIS Planning, Admin. Svcs., Data Comm. Network Sys. Mgt., Dir/Mgr. PC Resources
- 23. Dir/Mgr. Sys. Development, Sys. Architecture
- 31. Mgrs., Suprv. of Programming, Software Dev.
- 32. Programmers, Software Developers
- 33. Dir/Mgr. Sys. Mktg., Sales, Promotions Mgt.
- 60. Sys. Integrators/VarRs/Consulting Mgt.
- OTHER COMPANY MANAGEMENT**
- 11. President, Owner/Partner, General Mgr.
- 12. Vice President, Asst. VP
- 13. Dir/Mgr. Financ., Controller, Financial Officer
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 51. Sales & Mktg. Management
- OTHER PROFESSIONALS**
- 70. Medical, Legal, Accounting Mgt.
- 80. Educator, Journalists, Librarians, Students
- 90. Others _____

(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)

- Types of equipment with which you are personally involved either as a user, vendor, or consultant:
- A. Mainframes/Superminis
 - B. Minicomputers/Small Business Computers
 - C. Microcomputers/Desktops
 - D. Communications Systems
 - E. Local Area Networks
 - F. No Computer Involvement

E4043B-0



"I THINK IT'S TIME HE GOT HIS OWN SUBSCRIPTION TO COMPUTERWORLD."

YES, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of \$38.95* per year — a savings of 62% off the single
copy price.

First Name _____ MI _____ Last Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Address Shown: Home Business New Renew Basic Rate: \$48 per year

*U.S. Only. Canada \$110, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

(Please specify)

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. User: Other _____

(Please specify)

2. TITLE/FUNCTION (Circle one)

- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21. Dir/Mgr. MIS Services, Information Center
- 22. Dir/Mgr. MIS Planning, Admin. Svcs., Data Comm. Network Sys. Mgt., Dir/Mgr. PC Resources
- 23. Dir/Mgr. Sys. Development, Sys. Architecture
- 31. Mgrs., Suprv. of Programming, Software Dev.
- 32. Programmers, Software Developers
- 33. Dir/Mgr. Sys. Mktg., Sales, Promotions Mgt.
- OTHER COMPANY MANAGEMENT**
- 11. President, Owner/Partner, General Mgr.
- 12. Vice President, Asst. VP
- 13. Dir/Mgr. Financ., Controller, Financial Officer
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 51. Sales & Mktg. Management
- OTHER PROFESSIONALS**
- 70. Medical, Legal, Accounting Mgt.
- 80. Educator, Journalists, Librarians, Students
- 90. Others _____

(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)

- Types of equipment with which you are personally involved either as a user, vendor, or consultant:
- A. Mainframes/Superminis
 - B. Minicomputers/Small Business Computers
 - C. Microcomputers/Desktops
 - D. Communications Systems
 - E. Local Area Networks
 - F. No Computer Involvement

E4043B-0



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



IN DEPTH

Breaking the software logjam

Forget fancy formulas: Four simple but powerful principles can get developers rolling

BY TODD HIXON and
DAN GINSBURG

Software development is the main obstacle to getting better products out faster for many companies, and it's an area that few chief executive officers feel they have under control. Many view it as a perilous and unmanageable black art.

A few companies have excellent track records in software development, however. An in-depth analysis of their approaches shows that software development *can* be managed effectively. The key is to use an approach that is grounded in the principles of time-based competition while recognizing the special challenges of software engineering.

The president of a successful mobile communications company recently told us: "We've always been a hardware company, but software has become our key technology. Our new product line offers terrific ad-

Hixon, a vice-president at Boston Consulting Group, heads the firm's worldwide high-technology practice. Ginsburg is a BCS consultant experienced in technology and business development.

vances in features and the user interface due to a microprocessor-based design. Our problem is that the software is full of bugs. The product is 18 months late, and customers are screaming and withholding payments because it doesn't work."

No end in sight

This problem will get worse. During the 1990s, powerful forces will make software even more important. Demand for standards and effective imitation are turning basic hardware functions and architectures into commodities, causing vendors to reach for added value from additional features, user interface development and application-specific design.

Powerful microprocessors, cheap memories and high-level languages greatly expand the range of situations in which products controlled by complex software are practical. And so do vendors of operating systems and communications capabilities. Each of these product development paths is software-intensive.

The lore of software development contains a rich history of warnings to newcomers, particularly in that software developers are artists who cannot be managed, and tra-

ditional approaches to achieving speed (such as using parallel paths, setting deadlines and applying pressure) result in garbage. In fact, there's a classic pattern of disaster in software development that we've often observed and have come to call the slippage loop (see chart page 92).

Yet, the most important differences between the best and the worst performers lie in how they manage the people and the process.

Microsoft Corp.'s CEO Bill Gates has been quoted as saying, "There's only one trick in software and that is to use a piece of software that's already been written." However, that greatly oversimplifies the challenge. Computer-aided software engineering, modularity and software libraries are important, but they are not what distinguish the best performers. Nor do "skunkworks" provide a practical solution. Although they are fast, they are inefficient and disruptive to other products.

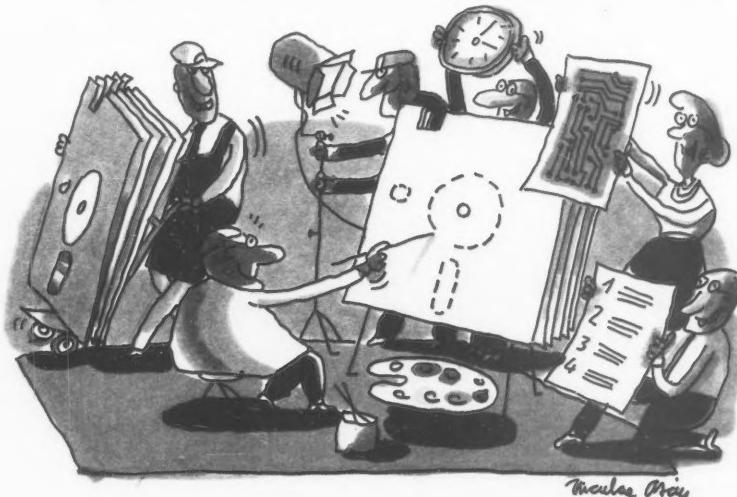
Major developers of large complex systems, such as large-scale telecommunications switching equipment and sophisticated radars, are often looking to achieve top-notch improvements in both the speed and quality of their product development. Observing and analyzing the methods and performance of some of the most effective software developers in the world can yield several key lessons.

It's up to management

The bottom line is that breaking the software logjam is primarily a managerial issue. There are great differences in the time required by different teams and companies to complete projects of similar complexity. (Complexity is measured in lines of code.) The worst performers take as much time to complete simple projects as the best performers require for projects that are three times as complex.

The following four basic principles of fast, high-quality software development have emerged from watching world-class software developers.

- **Shoot for effectiveness.** Effectiveness comes from working smarter, not necessarily faster. A strong focus on increasing the percentage of team time spent on the "main sequence" of work — the irreducible core



- **Mostly a management issue**
- **Poor programs waste time**
- **Learn from the best companies**



*The hands on the clock were
yesterday. A museum of
And as the Hula-Hoop®
REG. T.M. OF KRANSO
impending doom closed
burst into the small
large metal switching
And I said in a voice
turn into a Nebru
then, above the hiss of
“Relax. You bought an
you expand, up to 90%
Investment protection...
be yours.” And as I drove
I felt good because life, after*

waving good-bye.... I cleaned the garage obsolescence. Go-go boots and lava lamps. settled around my ankles, this feeling of in on me like night. So I rushed to work, room most people avoid and stared at this device sitting there Buddha-like in the dark. soft as a prayer, "Don't get old on me. Don't jacket. Grow. Expand. 30,000 lines." And the air conditioner, I heard this voice say, AT&T DEFINITY® System. I'm modular. As of my hardware can stay the same. ISDN... virtually limitless growth. It can all the Rambler home, the 8-track boomed and all, is just choices.



AT&T

The right choice.

COMPUTER INDUSTRY

NATIONAL BRIEFS

License and registration, please

Within weeks of telling the press that it will vigorously defend its rights in the software licenses that, it says, "are all we've got," software giant Computer Associates International, Inc. hauled UK-based professional services firm Hoskyns Group PLC into court. What's the charge? Indulging in outsourcing deals that violate CA software licenses. Not so, Hoskyns said. CA is reportedly looking to collect six-figure damages if it prevails.

Wrong license

Three San Diego computer retailers — Byte & Floppy Computers, Datel Systems, Inc. and CCC Computers — were fined \$2,000 by the Federal Communications Commission (FCC) for selling personal computers that were not certified by the FCC for home use. The PCs were certified as Class A, for use in commercial environments. Class B computers, for home use, must meet more stringent requirements for suppression of radio frequency emissions that may interfere with radio and television reception.

Not many winners in this race

Makers of campaign software face trying to sell their wares in a skittish market

BY MITCH BETTS
CW STAFF

Selling computer software to politicians — for keeping track of fat-cat donors, legions of volunteers and those pesky financial reports — seemed like such a sweet idea back in the mid-1980s, when packages with names like Election Machine and Campaign Coordinator hit the market.

After all, 470 seats in Congress are up for grabs every two years, not to mention state and county races. But veterans of this market niche caution that selling software to political campaigns is a tricky game, where quite a few small-time players come and go and very few make a profit.

Arnold Winikoff knows just how brutal the market can be. He tried to sell a high-end hardware/software combo with a \$20,000 price tag and discovered what economists call "price sensitivity." Prospects typically hung up the phone about 15 to 20 seconds after they heard "\$20,000," Winikoff said.

With that marketing effort written off as a failure, Winikoff, president of Minneapolis-based Q.E.D., Inc., has decided to skip this year's election, downsize the system and its price and try again next year. "The wounds haven't healed from beating my head against the wall," he said.

The big campaigns for the U.S. House and Senate and state governorships seem to have a lot of money to throw around to high-priced media consultants, but not much for computers and software. Overall, politics was a \$1 billion industry over the two-year cycle leading up to the 1988 elections, but software spending probably

Campaign software vendors

A sampling of campaign software vendors shows that most are willing to sell to either political party, got their start around 1986 and are located near the nation's capital

Vendor /location	Started	Partisanship
Aristotle Industries, Inc. (Washington, D.C.) Campaign Software, Inc. ³⁾	1983	
Grass Roots Systems, Inc. (Falls Church, Va.)	1986	
Hannibal Software, Inc. ⁴⁾ (Washington, D.C.)	1983	
Headline Systems, Inc. (Farmington Hills, Mich.)	1986	
Political Publishing Co. (Alexandria, Va.)	1987	
Primary Systems, Inc. (Falls Church, Va.)	1989	
SD Associates (Hartford, Conn.)	1984	
Victory Technology, Inc. (San Francisco)	1986	

1)A sampling of major vendors, not an exhaustive list 2)Commercial software sales

3)Subsidiary of Aristotle 4)Recently spun off from LSW, Inc.

CW Chart: Paul Mock

amounted to less than 5% of the total, according to John Aristotle Phillips, president of Aristotle Industries, Inc. in Washington, D.C.

"It's a tough market to break into," acknowledged Howard Langston, president of the 1-year-old Primary Systems, Inc. in Falls Church, Va. "I think we're going to make it, but there are a lot of companies out there that don't."

Indeed, the industry seems to be in a perpetual state of shakeout. Three years ago, Aristotle Industries bought competitor Campaign Software, Inc. More recently, LSW, Inc. in Landover, Md., sold its Hannibal software unit — which it had acquired in 1988 — to a

group of investors led by Jim McCarthy, former president of Campaign Software and president of the new Hannibal Software, Inc. in Washington, D.C.

In addition to the acquisitions among the market leaders, there are the so-called garage-shop operations. "There are lots of small, one- or two-person operations that come in every two years and sell a half-dozen packages, and then they'll go out of business," industry pioneer Phillips said.

"Most of our customers nowadays are people who are not on their first software program. People are bringing us a database that's mangled, or the

Continued on page 95



INFOMART FROM APPLE TO XEROX.

INFOMART is where you can see and evaluate the latest in information and communications technology. From more than 100 companies like Apple, Andersen Consulting, AT&T, EDS, Epson, GTE, IBM, NCR, Novell, Texas Instruments, Xerox and many more. Call today to get your free 72 page INFOMART Directory. It's the easy way to make your visit to INFOMART even more productive.

Call today to get your free directory. 1-800-232-1022

INFOMART

Where the leaders in automation share their knowledge with you.

INFOMART 1950 Stemmons Freeway, Dallas, Texas 75207 INFOMART is a registered servicemark of IFM partnership.

COMMENTARY

Jean S. Bozman

RDBMS: The future is still uncertain



In the universe of relational database management systems, the firmament is shifting — and it isn't all that clear which stars will rise and which will set.

Just two years ago, the brightest stars in the West Coast RDBMS world were easy to pick out: Oracle, Ingres, Sybase and Informix. As the two largest purveyors of RDBMS technology — that is, outside of IBM — Ingres and Oracle were at each other's throats back then. They traded barbs in their advertising campaigns and key executives made veiled references to "the arch-enemy" at industry conferences. Ingres styled itself as "the good guy," complete with white hats sported by attendees at the company's May 1990 user conference in Salt Lake City. Oracle, which didn't par-

THE RECENT NEWS about Ingres and Oracle has prompted a fair amount of uncertainty, but few knowledgeable observers fear an immediate impact on either companies' product lines.

ticularly seem to mind its "bad-boy" image, never flagged in its attempts to criticize its competitor across the San Francisco Bay.

Today, their duel is ancient history. Oracle, in the wake of a collision with its first major financial obstacle [CW, Sept. 24], has its worries cut out for it right in its own backyard. Ingres, which struggled along on low cash reserves for most of 1990, is now awaiting the final moves in its pending acquisition by nearby Ask Computer, Inc.

The recent news about Ingres and Oracle has prompted a fair amount of uncertainty, but few knowledgeable observers fear an immediate impact on either company's product lines. At least the near-term survival of both the Ingres and Oracle product sets is guaranteed by the time it takes to migrate data into new DBMS structures. However, uncertainty about whether that "survival" will mean the continued support of all existing products is what's sending shivers of fear down many users' spines. Right now, most users are adopting a wait-and-see attitude while nervously tapping their feet.

At Ingres, no one is sure what eventual shape the new Ask organization will take. That should become clear after the merger is finalized at the end of this month. Early reports indicate that it will be a blended entity, with much blurring of

the lines around the Ingres RDBMS product and software tools. Ask's equity partners, EDS and Hewlett-Packard, which fueled the acquisition with \$60 million, intend to provide vertical market applications and consulting services to Ingres users.

At Oracle, there is some question about future research and development plans. Worries about support and service surfaced at the recent International Oracle Users Group conference in Anaheim, Calif. [CW, Oct. 1]. The prospect of future financial instability is also beginning to dampen enthusiasm for Oracle products at some large sites. Users are voicing concerns about the degree of vendor dependence that a large-scale Oracle financial application would create.

Meanwhile, a fundamental change in the way IS handles multiple DBMSs is taking place. The growing user movement toward open standards and Unix will lessen the proprietary — and therefore the profit-making — value of the raw DBMS engines. Leveraging standards, users are now able to mix and match data from multiple databases.

This technical change, along with a large installed base of nonrelational databases, helps explain why the RDBMS industry is hitting the wall. The impending recession is breeding conservatism in users' purchasing plans. In reaction, Oracle and Ingres/Ask are both shifting toward software tools and applications software. Informix recognized the trend first, as it moved to alliances with more

than 2,000 value-added resellers. Even Sybase, the smallest of the RDBMS bunch, is now willing to sell its tools and its network servers independent of its database engine.

No one wants their vendor to be fighting for survival — or even for profitability. No one likes their vendor to be acquired. Most of all, no one likes to guess at the future viability of the RDBMS product that warehouses a corporation's vital sales information. Yet, we will all have to live with this uncertainty in early 1991 until a new picture of these two wounded RDBMS gladiators begins to emerge.

Bozman is *Computerworld's* West Coast bureau chief.

Networking from Unisys by tying it all together.

Our open networks surround your mainframes with servers and workstations, meeting standards like OSI, TCP/IP, and SNA. They meet enterprise needs by internetworking LANs and WANs via

Winners

CONTINUED FROM PAGE 93

company's no longer in business," he added.

John Stalcup, president of San Francisco-based Victory Technology, Inc., said the short-timers typically lack the financing needed for continuing software development and nationwide marketing.

The few vendors who are making a profit in the campaign market have found that they must keep the software price below \$5,000 and provide turnkey consulting services to bring in supplementary revenues. "I don't think we would be making any profit if we just sold software," said John Convy, president of

Grass Roots Systems, Inc. in Falls Church, Va.

Consequently, several of the leading vendors are diversified, providing campaigns with sophisticated databases that contain not only politically relevant information on every registered voter in the state but also demographic data about them for targeting campaign mailings. Aristotle Industries has gone even further by publishing a trade magazine, *Campaign*, designed to serve as an advertising vehicle.

One problem facing companies in the industry is competition from people close to the candidate — such as a law partner, the cousin at MIT or "Uncle Buck" — who are willing to write custom software for the campaign. That may work in very

small campaigns, but Uncle Buck's software will be lacking in support, documentation, timeliness and richness of features, the vendors said.

Stalcup noted that his software has been through three revisions, 8,500 man-hours of programming and 32,000 lines of code. "Uncle Buck's not going to do that in three months," he said.

But which?

Each vendor has had to make a strategic decision about whether to sell only to candidates of one political party (see chart page 93). Close ties to one political party can be a marketing advantage, but that strategy also cuts an already-small market in half.

Explaining why his company works

only with Democrats, Convy said, "I want people to be comfortable discussing their campaign plans . . . and sending us their donor lists for us to import into our package." However, most of the other vendors are willing to sell to either of the two parties.

"There's not a whole lot of sense in being a partisan company if you're just going to be a computer software vendor. If you're going to be a consultant as well, there are reasons to stay partisan," Langston concluded.

All of the vendors are gearing up for the big 1992 election season, when there will be a slew of competitive races brought on by redistricting and retirements, as well as the presidential campaigns.

Some of the older software packages, first written in the early 1980s, will have to be updated with graphical user interfaces and speedier processing, according to McCarthy. He said the big question for each vendor is, "do they make the investment [in rewriting the software] or do they get out of the business and move on?"

sets information free



Everyone faces the same problem: You can't get your arms around the information that runs your enterprise. Or move it freely to where it's needed. And everyone gets the same general answer: Networking.

But that only raises more questions: What kind of network? How open? How wide? From whom? So here's a precise answer: Unisys. And here's why.

No other computer company has more experience in enterprise-wide networking. So we can bring your information together with a full range of products, from workstations, servers and mainframes to data, voice and image networks. And no matter what computers you work with, our commitment to open standards is so broad you can operate with OSI, TCP/IP, X/Open, IBM and DEC networks.

Our systems integration expertise, our experience in LANs and WANs, our leadership in the world of FDDI, X.25, T1 and T3 technologies all can be applied to support the networking needs of your entire enterprise.

Our goal is admittedly ambitious: to give you across-the-board interoperability in the multi-vendor world. But that's all the more reason to give us a chance to compete, and see how our open information networks can move your enterprise ahead by bringing it together. Just call 1-800-448-1424, ext. 49.

© 1990 Unisys Corporation. X/Open is a trademark of X/Open Company Ltd. IBM is a registered trademark of International Business Machines Corporation. DEC is a registered trademark of Digital Equipment Corporation.

We make it happen

Software campaign

An informal survey of vendors found that the campaign software market has a variety of challenges, some of them peculiar to politics:

- **Entrenched incumbents.** Often, office-holders see little need for computers when they keep winning elections by landslides without them. For 19-term U.S. Rep. William H. Natcher (D-Ky.), who spent only \$8,397 on his 1988 re-election campaign and won with 60% of the vote, a computer "would only take up valuable family-picture space on his desk," noted *Campaigns & Elections* magazine.

- **Multiple competitors.** Campaign software vendors are not only competing among themselves but also against other big-ticket campaign expenditures, mostly for television advertising and direct-mail services. In addition, some campaigns are content using conventional spreadsheet and word processing software.

- **Multiple decision-makers.** Buying decisions are usually made by two or three campaign leaders, including the campaign manager or top political consultant, the treasurer and the computer manager, according to John Convy of Grass Roots Systems.

- **Compressed timing.** A campaign is like a corporation with 300,000 records that pops up overnight and closes two years later. "One day in the campaign cycle is worth 20 corporate years," Convy said, so campaign managers expect to have their computer systems up and running virtually the day after they decide to buy them.

MITCH BETTS

Early earnings figures up despite slowdown

BY RICHARD PASTORE
CW STAFF

The first rush of third-quarter earnings showed the rich getting richer, the perennial also-rans running stronger and one behemoth still struggling to build momentum.

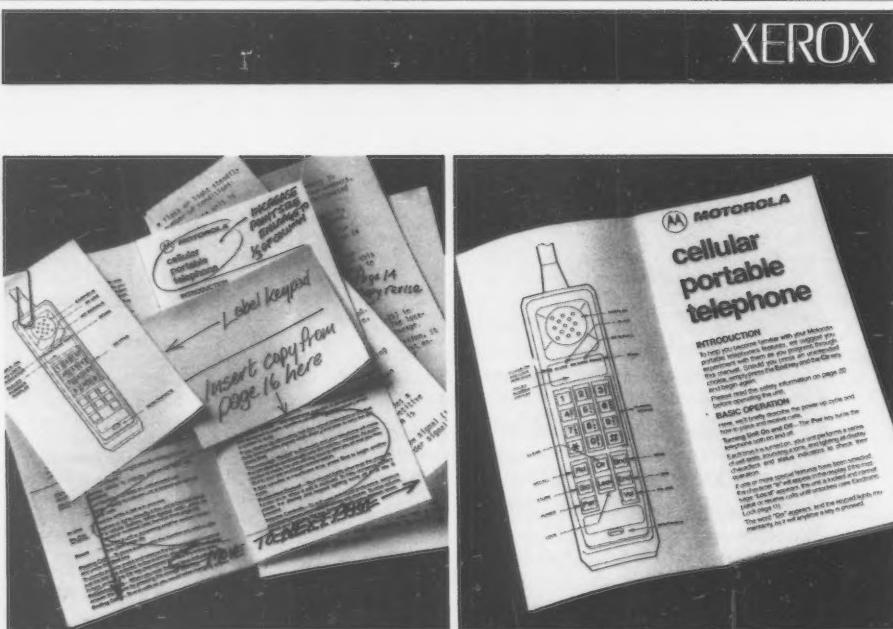
Outstanding numbers from Microsoft Corp. would seem blasé by now if not for the fact that the company remains one of the few consistent bright spots in the industry. This quarter, the leading personal computer software vendor was buoyed by revenue from Windows 3.0, which caught fire upon release earlier this year.

1990 third-quarter earnings Most companies experienced double-digit earnings gains

Company	Revenue July through September (in millions)	Percent change from 1989	Net income July through September (in millions)	Percent change from 1989
AST	\$136.3M	19%	\$11.4M	293%
Borland International	\$55.6M	10%	\$8.9M	112%
Cypress Semiconductor	\$55.6M	7%	\$8.3M	4%
Exabyte	\$32.2M	6%	\$6.1M	90%
Microsoft	\$369.4M	57%	\$87.6M	77%
NCR	\$1.5B	9%	\$91M	33%

*Parentheses indicate a reduction or loss

CW Chart: Doreen St. John



Motorola wrote the book on cellular phones. A Xerox system lets them rewrite it in minutes.

Motorola is the world's largest producer of cellular phones. Not to mention cellular phone manuals. For which they turn to a company called Rich Graphics.

But when Motorola decided they wanted to be able to revise and reprint their manuals on a "just-in-time" production schedule, Rich Graphics turned to Xerox.

Working with Rich Graphics, Xerox developed a solution that integrated both hardware and software, Xerox products and other suppliers' products. And the resulting phone manual production is something to talk about—to say the least.

The manuals are now printed on Xerox laser printers just minutes after the revisions flash across the screen of a

Xerox workstation. Turnaround time is 80% faster. Costs are down 50%. And the documents produced are 99.9996% perfect.

Of course, Motorola isn't the only client that Rich Graphics uses Xerox for. And the resulting improvement in customer satisfaction has helped Rich Graphics double their printing business every year since they came to Xerox.

Which just goes to show that a partnership with Xerox can also help a company rewrite its bottom line.

If you have a document processing problem you'd like Xerox to help you solve, call 1-800-TEAM-XRX, Ext. 125A. Or send in the coupon.

Yes, I'd like to learn more about Xerox and how they can help solve document processing problems.

- Please send me information.
- Please have a sales representative contact me.



Send this coupon to: Xerox Corporation, P.O. Box 24, Rochester, NY 14692

NAME _____ TITLE _____

COMPANY _____ PHONE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____ 00013-102290

© 1990 XEROX CORPORATION. XEROX® is a trademark of XEROX CORPORATION.

XEROX
The Document Company

However, Microsoft's smaller competitors are not rolling over and playing dead. Toiling in the shadows of the big guys for years, Borland International is finally seeing its products gain significant penetration into the PC applications market.

Borland's Quattro Pro spreadsheet, a new version of which shipped last week (see story page 14), and Paradox database management software packages in particular are logging hefty sales gains at the expense of Lotus Development Corp. and Ashton-Tate Corp., according to surveys by Computer Intelligence in La Jolla, Calif. [CW, Oct. 15]. The copyright infringement lawsuit that has been lodged by Lotus has not seemed to dissuade many users from embracing the Borland products.

Another so-called second-tier player, AST Research, Inc., again posted double-digit gains despite single-digit prospects for overall PC sales growth. AST is doing it largely on the strength of high-end PC sales.

"Increasing sales of higher performance systems — our Premium 386 and 486 computers — continue to provide AST with growth in both revenue and earnings," AST President Safi Qureshy said.

Machines based on Intel Corp.'s 80386 chip accounted for 60% of the quarter's sales at AST, a 77% increase over the comparable period last year, the company said. Intel i486-based sales also grew 20% from the preceding quarter.

Not all good news

The news was not so cheery at veteran systems maker NCR Corp. Though revenue was up 9% for the quarter, net income dipped, prompting Chief Executive Officer Charles Exley Jr. to downgrade his expectations for the year.

"We still expect to achieve growth in revenue and earnings per share for the full year," Exley said.

However, "As a result of disappointing U.S. order levels in the second and third quarters, it now appears unlikely that we will achieve net income growth for the full year," he said.

NCR suffered a "considerable decline" in U.S. orders while noting a gain in overseas orders. Unfortunately, excluding currency adjustments on backlogged orders, the U.S. dollar value on worldwide orders declined during the quarter, Exley revealed.

Chicago-based Arthur Andersen & Co. had an exceptionally good year, the company reported at its annual worldwide partners' meeting in San Francisco last week. For the year ended Aug. 31, Andersen's total revenue rose 23% to \$4.16 billion from \$3.38 billion the year before.

While Andersen's audit and business consulting operation grew 18% to \$2.28 billion, the greatest growth was in its other business unit, Andersen Consulting, which grew 30% compared with the previous year to \$1.88 billion. Total worldwide personnel increased at the company to 56,800 from 51,400, and the number of worldwide partners increased to 2,292 from 2,134.

One of the first chip makers to report, Cypress Semiconductor Corp., heralded the news of better things to come. Belying the purported industry slowdown, Cypress experienced record demand for its products. The company posted its second-best quarter ever for new orders, according to Cypress President T. J. Rodgers.

A DATA SYSTEM SO RELIABLE THEY PUT ALL THEIR PASSENGERS ON IT.

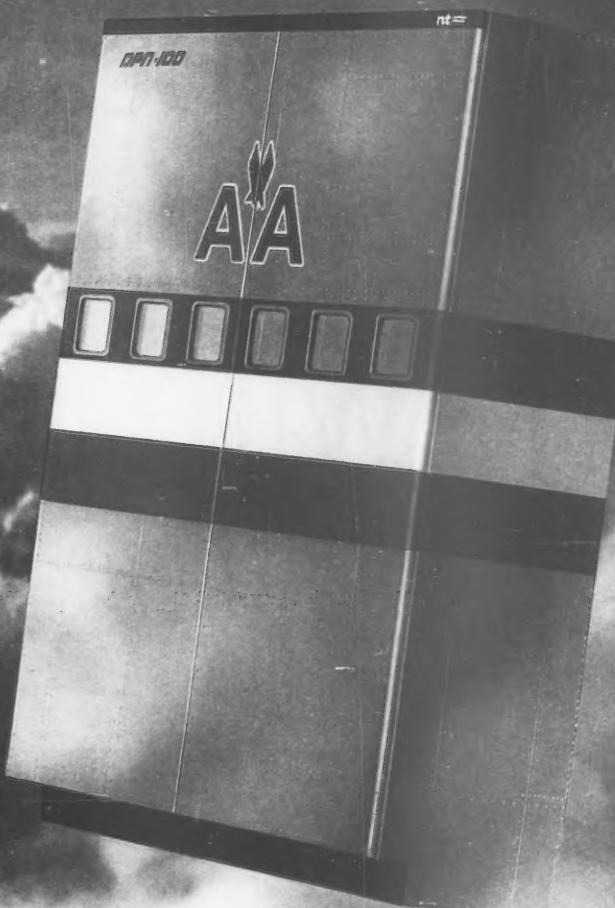
It's a Northern Telecom DPN-100 packet switch. One of a fleet that links the American Airlines SABRE® reservation network—the world's largest private real-time computer network and the biggest travel information database.

American knew about our dependability before they started using our packet switching. For years American has used our PBXs and relied on centrex services from Northern Telecom systems. Even so, American was impressed by our 99.995% system availability—a level our

data systems actually exceed in every kind of network—from the smallest to the world's largest.

And as American grows it can expand easily. Because our systems are X.25 and SNA compatible, and our modular design takes on increased traffic without new equipment.

So if your company needs a reliable global data network, call 1-800-NORTHERN. We'll get one up and flying for you.



NORTHERN TELECOM

TECHNOLOGY THE WORLD CALLS ON

© 1989 Northern Telecom. DPN is a trademark of Northern Telecom. COR002A

To maximize the millions you've spent on computers, spend three days with us.



Michael H. Spindler
Executive Vice President, COO
Apple Computer, Inc.



Ellen M. Hancock
VP & Gen. Mgr. Comm. Sys.
IBM Corporation



Gary Stimac
Sr. Vice President
Compaq Computer Corporation



Michael R. Hallman
President
Microsoft Corporation



Charles E. Exley, Jr.
Chairman, CEO
NCR Corporation



Ezio Torrisi
President, CEO
NetFRAME Systems, Inc.



Katherine M. Hudson
VP & Dir. Corp. Info. Systems
Eastman Kodak Company



Bill Byssinger
Dir. Information Systems
Aldus Corporation



Brigitte Morel
Vice President & Director
Dataquest Europe, SA



William Hasler
Vice Chairman
KPMG Peat Marwick



INTERNATIONAL
TECHNOLOGY
SUMMIT

Businessland is gathering the best minds of the industry to discuss the most pressing issues of the day—namely, downsizing corporate systems, client/server computing and the outsourcing issue. And you're invited to pick the brains of the experts.

Our International Technology Summit will be held on December 5-7, 1990, at the INFORUM in Atlanta, Georgia, USA. Call 1-800-328-8383 for a conference brochure and registration information. It will be the most profitable three days you've ever spent.

BUSINESSLAND

© 1990 Businessland Inc. Businessland and the Businessland logo are registered trademarks of Businessland Inc. All brand and product names appearing in this ad are registered trademarks or trademarks of their respective holders.

COMPUTER CAREERS

Making the leap to academia: Take care

BY SHERYL KAY
SPECIAL TO CW

Being the first to formulate ideas and pass them on to others was part of Jack Rockart's motivation to leave IBM 25 years ago and join the faculty at MIT in Cambridge, Mass. He is now the director of the Center for Information Systems Research at MIT's Sloan School of Management.

Two years ago, Bruce Kavin achieved the vice-presidency of information services for a division of The Dun and Bradstreet Corp., but found himself working considerably more than the average work week and enjoying it less. After these first stages of burnout, Kavin decided to pursue a Ph.D. in MIS at the University of Georgia in Athens and, upon completion, seek a university faculty position.

After 13 years at Control Data Corp., Michael Smith chose to head into the academic world where, he says, there is more of an emphasis on leading-edge technology and research. He is currently the associate director of computer operations at the National Center for Supercomputing at the University of Illinois.

Making the switch

However, IS professionals considering a move to academia must be strongly motivated; it's a major career change, a different culture, and many allowances have to be made.

First, IS executives may find it difficult to reverse direction if they find the academic world is not for them, says Dianne Edmondson, president of systems recruit-

ing firm ACP, Inc. in Denton, Texas. "I've never had a client say 'my ideal candidate would come out of academia,'" she says. Companies would prefer to hire someone from an environment similar to their own, such as a competitor. Many firms, she continues, believe the old saying "those who can't do, teach" and will view a faculty position negatively. "And although that obviously isn't true, we are talking about perceptions, not reality," she says.

A second major consideration is salary. The average nine-month salary for an industry executive entering the teaching profession at a university (holding a Ph.D., of course) ranges from \$36,000 to \$55,000. Those with 10 or more years of university-level teaching experience can expect anywhere from \$60,000 to \$90,000. These industry executives are often leaving jobs that carry six-figure incomes.

Third, obtaining a Ph.D. — which can take upwards of three years or more — is essential if you're interested in becoming a professor at a top-level university. Some of these schools will hire a nondoctoral degree teacher but will treat him like a second-class citizen, according to Kavin. Without a Ph.D., he would have been referred to as a visiting executive or something similar, he says.

If you're heading into research, you must publish articles in industry journals as well as academic treatises, says Lewis Leeburg, a 31-year veteran of IBM who is now teaching at the University of Califor-

nia, Los Angeles. This should be done while in the corporate world and during doctoral studies, says Leeburg, who learned that his publications list was on the lean side.

Leeburg says he was able to obtain a lectureship position — not a tenured faculty track position. Therefore, he is not eligible for a professorship, does not have sabbatical rights and can't vote in the academic senate.

Cultural adjustments

Seven years later and now the director of the IS research program at the Anderson

Graduate School of Management at UCLA, Leeburg says that possibly the most difficult adjustment was the cultural change.

When Leeburg first started teaching in 1983, he says, he was "scared to death." He had taken over someone else's syllabus and says that he felt a little lost. "I had been making presentations for years at IBM, but the nature of the audience is totally different in a university classroom. By the end of the first quarter, I was no longer scared to death, but it took me about three years before I felt totally in the groove," he says.

An adjustment Rockart is still dealing with is the slower pace. "Everything in academia is longer term," he observes, "and the rewards may not be as visible or as concrete."

Also, Leeburg finds that universities are more frugal when it comes to travel



and reimbursement expenses, while companies are flexible.

"They understand you may not always have a receipt for, let's say, a call from a telephone booth, whereas a university might view a \$10 dinner as being expensive and unnecessary," he says.

Common denominators

Whatever the motivation for these former IS executives — burnout, wanting to work on the leading edge of technology — a common goal they all share is the desire to mentor and work in a learning environment.

"One of my favorite tasks at D&B was developing subordinates and mentoring, which, in academia, I can do full-time," Kavin says.

"What really turned me on at IBM was the learning, not the money," Rockart says. After four years, however, he felt most of the learning was behind him at IBM, while with a job in academia, he would be in a teaching/learning environment forever.

Although teaching is secondary to Rockart's research duties, he says, "I get a kick out of working with young, bright people who are hungry to learn."

Maxine Rockoff, a senior administrator for the Carnegie Commission in Manhattan, reaps the advantages from both worlds. In her current consulting position with the commission, Rockoff maintains a corporate-level income, while her part-time teaching positions at New York University and the Polytechnic Institute of New York fulfill her desire to teach. "I love doing something that matters," Rockoff says.

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.

CONTRACT PROGRAMMERS WITH A MINIMUM OF 4 YRS EXP. ADABAS/NATURAL 2.0 SENIOR PROGRAMMER/ANALYST

Up to \$45 Per Hour

DATABASE ADMINISTRATOR PREDICT AND UTILITIES

Up to \$50 Per Hour

OPENINGS IN CA, TX, LA, MO, IL,
OH, MI, NC, VA, AND WEST VA.
J.P.S. INC.
P.O. Box 630007
Houston, TX 77269
(713) 820-0024
Toll Free (800) 633-0391
FAX (713) 820-0024
No travel or part-time positions
Equal Opportunity Employer

ANALYSTS • PROGRAMMERS • HW/SW In a Slow Market, You Need A Quick Employment Service

If you have marketable skills, together with reasonable geographic and salary requirements, your resume will be on its way selectively, to our applicable contacts among our 1000+ client companies and 200+ affiliates nationwide. **Within 24 hours after we receive it.** No cost or obligation to you, no sales pressure.

Our clients seek 2 years minimum professional experience, stable work history, good technical references, and U.S. citizenship or green card.

TO APPLY: Mail or FAX resume or call Howard Levin.

RSPV SERVICES

Dept. C, Suite 614, One Cherry Hill Mall, Cherry Hill, NJ 08002
800-222-0153 or FAX: 609-667-2600 (refer to Dept. C)

EXECUTIVE DIRECTOR, COMPUTING

We seek applications for the position of Executive Director, University Computing. This individual will direct all computing service activities at the University, including administrative and academic computing.

Located in Southeast Michigan between Detroit and Ann Arbor, our current enrollment is over 25,000. We are engaged in an aggressive migration from a VSE and VM/XA environment to MVS/ESA running on an IBM 3090 150J. Our campus network has doubled in the last two years to more than 1700 PC's and terminals, and we are in the first phase of a fiber optic network implementation. A major current goal is the implementation of an integrated student information system (ISIS), including telephone registration capability.

The Executive Director should be a seasoned senior executive with strong leadership skills; with a Master's degree in MIS, Computer Science or related field (or equivalent in experience); and ten years of progressively responsible experience providing the knowledge to coordinate the operation described above. Qualified individuals should reply to address below with letter of interest, resume and the names of three references. Review of responses will begin November 5 to: Chair, Selection Committee, POSITION APEX91004, 310 King Hall, EASTERN MICHIGAN UNIVERSITY, Ypsilanti, MI 48197.

We take pride in the pursuit of our affirmative action objectives and encourage women and minorities to consider this opportunity. Multicultural experience desired.



NETWORK DEVELOPERS

- Leading edge UNIX® technology.
- Exciting new challenges.
- Small creative atmosphere.

You can have it all with INTERACTIVE Systems, the leading developer of UNIX software for Open Systems Networking.

We need you to port, enhance and support OSI and TCP/IP networking products and services for our OEM customers.

Our requirements are: 2 to 5 years experience in the Unix kernel, TCP/IP, or OSI networking, System V STREAMS or real time operating systems BS or MS in computer science as well as strong C programming skills.

Recent graduates are acceptable if major project work included UNIX.

For more information, please send your resume to Pam Mathesius, Dept. CW, INTERACTIVE Systems Corporation, 1901 North Naper Blvd., Naperville, Ill. 60563 or FAX to (708) 505-9133.

INTERACTIVE

A Kodak Company

"UNIX is a registered trademark of Unisys System Laboratories, Inc. in the US and other countries."

A Terrific Opportunity

Computer Consulting Group
one of the Southeast's fast-
est growing contract pro-
gramming and consulting
firms, has immediate openings
for talented Programmer/
Analysts with 2 or more
years experience. Excellent
Salary & benefits package.
We're especially seeking:

NATURAL/LADARAS
CICS/COBOL
DB2/DB/DC
IDS/ADS/ASO
TECH. WRITER
NET/COM
DB2
S/BS
S/BS PROGRAMMER
SALES/ORTHRAN/COBOL
PL/I/COBOL
VAX/VMS/VME
AS/400/COBOL
S/AD
GENERAL/DATACOM

Computer Consulting Group

Contract Professional Services
Research Triangle Area
4109 Wake Forest Rd.
Suite 307
Raleigh, NC 27609
1-800-222-1273
(803) 738-1994
FAX (803) 738-9123

**SENIOR
PROGRAMMER
ANALYST**

The largest PC Focus LAN based environment in Michigan is looking for a Sr. Programmer Analyst. Responsibilities include software development, analysis, maintenance, and support. Bachelor's degree in computer science, or engineering preferred. The position requires 4-6 years progressive programming experience with FOCUS and a Novell based LAN environment is required. AS/400 and RPG, 400 experience a plus. If you possess what we're looking for and have strong analytical and communications skills with a demonstrated ability to manage complex system software projects, please send your resume and salary history to:

Karen A. Boyce
Recruitment Manager
Linton: Campbell-Ewald
30400 Van Dyke
Warren, MI 48093

SYSTEMS ANALYST wanted. Data Development and implementation of programs meeting corporate standards for a Human Resource system for a major automotive manufacturer. Job responsibilities also include preparation of JCLs to meet production standards and meeting with users during implementation. The job requirements consist of IBM 360 and IBM PC using the following software and languages: MVS/VM, DB2, CICS, TSO/ISPF, AS/400, XPLINK, COBOL, PASCAL, FORTRAN, COBOL, DOS, UNIX, FOXBASE, VM/CMS, DOS/VSE and SOLIDS. Pay is \$32,300/yr. 40 hr/wk. Relocation to 7310 Woodward Ave., P.O. 415, Detroit, MI 48202. Ref. #75190. Employer Paid Ad.

TELECOMMUNICATIONS Systems Analyst wanted to design, develop, analyze and maintain user-terminal interface short term and long term company performance forecasting systems on IBM mainframes and PCs and TSO midframe using Fourth Generation Language. Duties include assessing company's sales and financial performance; support product management with ad hoc reporting and analysis; research, identify and recommend methods of potential growth for management. Requires M.B.A. in Management Information Systems and must have Master's degree. Computer experience in Application Systems Design, Quality Analysis, Marketing Strategy, and Database Management. \$28,500.00 per year, 40 hours per week. Send resume to P.O. 415, Woodward Ave., Room 415, Detroit, MI 48202. Ref. #72690. "Employer Paid Ad."

A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely is competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who would consider new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

More job seekers see your ad in *Computerworld* than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals expect to see the most jobs every week.

Computerworld gives you regional editions

A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.



Computerworld needs just 3 working days for your ad to appear

That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

Computerworld costs no more than local papers

And with a regional line rate of just \$10.80, your cost-per qualified candidate reached is better than *any* newspaper - Sunday, daily or trade. Or just about any other source, for that matter.

Computerworld leads candidates to your ad

Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive or active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.

And while times may change, some things won't. Whether you *use* computers, *make* computers, or *sell* products and services *for* computers, *Computerworld* is still your major source of news today. And your major source of computer professionals tomorrow.

For more recruiting tips, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



**Weekly. Regional. National.
And it works.**

SR. PROGRAMMER ANALYST**IBM 3090 Mainframe****\$30-\$35K D.O.E.**

- New Development Positions
- Diverse and Challenging Work
- Relocation Assistance Available

Dept. of Health and Welfare has immediate openings for COBOL/CICS/VSAM professionals who have had accounting system experience. We also have positions available for experienced ADABAS/NATURAL2 professionals.

Explore Idaho in a 4 season climate that averages 214 days of sun. Idaho's low cost of living offers a quality lifestyle as well as cultural ammenities and recreational opportunities you don't want to miss. Idaho...America's Best Kept Secret.

For further information
Contact Larry Tippets, 208-334-5653.
eoee



You've done without
Florida
long enough!

Metro Information Services, an Inc. 500 company for six consecutive years offers challenging and rewarding opportunities in Tampa and Orlando. Our benefits include 401-K, Med/Dental, cash profit sharing bonus, and the use of a condo in the mountains for vacation. If you have two years or more in exp. with one of the following skills:

COBOL IMS HP-3000**CICS DB2 UNIX/C****IDEAL AS400 IMS (Sys.Prog.)**

Please call, Fax or mail your resume to:
Information Services, Inc.

5300 West Cypress, Suite 285, Tampa, FL 33607
Fax 813-286-1011 Phone 813-289-6955

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

IMMEDIATE openings in Michigan and N.W. Ohio for Programmers/Analysts with ANY of the following skills:

PL/1, IMS, IDMS, AOS/400, CICS DL/1, COPICS, S/38 MAPICS SYSTEMATICS, AS/400

If you have programming experience and would like the opportunity to work in an environment of challenge, we are interested in you. Excellent benefit package and paid overtime included. Send resume to:

AZTEC Computer Services, Inc.
P.O. Box 341
Perryburg, Ohio 43551
EOE

Computer Systems Engineer wanted to analyze complex systems requirements; design, develop and implement banking and financial systems. IBM VME Large Systems, A-Series, B1000 and CP2000 mainframes; using GEMCO, COMS and BNA software. Knowledge of COBOL, PL/I, C, C++, FORTRAN, ALGOL languages and MCP operating systems. Requires Bachelor's degree in Computer Engineering, Computer Science or Electrical Engineering; two years experience in the job offered or two years related experience as a Computer Systems Analyst and Computer hardware experience in interfacing and Disaster Backup; \$41,000 per year; 40 hours per week. Send resume to: 7310 Woodward Ave., Dept. 10290, Detroit, MI 48222. Ref. #70290.

IS PROFESSIONALS

Unprecedented growth has been achieved by experienced, talented Programmers, Senior Programmer/Analysts, DBA's and Systems Managers. Current needs include:

I B M

• CICS, DB2
• NATURAL/ADABAS
• AS/400
• CICS, S/38
• IDMS, ADS/O
• IMS DB/DC, CICS, S/38

D E C

• VAX 3200 FORMS 3.0, C
• VAX INGRES, ABF,
FORTRAN
• VAX COBOL, Smarter,
DB2
• NATURAL/ADABAS
• Q or C, Clearance,
FORTRAN, DECNET

We offer state-of-the-art work environments, excellent compensation, relocation and professional visibility. Send your resume TODAY! (Degree preferred).

**AMERICAN COMPUTER PROFESSIONALS**

140 Stoneridge Drive
Suite 350
Columbia, SC 29210
(800) 933-8227
EOE

MIS DIRECTORS

If you need good people, we've got them. Computerworld reaches more than 612,000 computer pros every week. That's more qualified computer pros than any newspaper can deliver. And you can select either a regional edition or national edition of Computerworld's Computer Careers section for your ad.

For more information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

**COMPUTERWORLD**

Where the best hires look. Every week.

REGIONAL BUSINESS SYSTEMS CONSULTANT

Nissan Motor Corp. in U.S.A. has an opportunity in Dallas, Texas for an individual to provide Information Systems support.

You will handle the development of systems plans, including identifying/prioritizing needs and making recommendations to meet those needs. Responsibilities also include participating in the coordination of regional systems activities nationwide, as well as providing training and technical assistance on various applications and hardware/software needs. This position involves some travel.

The ideal candidate will have a BA/BS, preferably in Business Management, with 7+ years of experience. Background must include knowledge of IBM technical environments (30xx, AS/400, PC), PC DOS, and other general PC software. Excellent communication and analytical skills are necessary. An automotive background and/or experience in a high volume operation preferred.

As a progressive force in the automotive industry, Nissan offers a superior salary and company-paid benefits package.

LOCAL INTERVIEWS WILL BE CONDUCTED.

To arrange your interview, send resume to: Nissan Motor Corp. in U.S.A., P.O. Box 191-CWBC216, Gardena, CA 90248-0191.

Nissan is an equal opportunity employer and offers employment opportunities to men and women of all races, religions, national origins and ages.



Built for the Human Race.

50 Ways To Leave Your Company

In today's world of mergers and buyouts, your future with a company can be uncertain. You owe it to yourself to take charge of your career. There can be up to 50 companies at TECH FAIR where you can meet and discuss the high tech marketplace.

TECH FAIR offers an excellent opportunity for engineers and computer systems professionals to meet face-to-face with high technology companies who have job openings that need to be filled immediately.

At TECH FAIR, you can find out what you're worth, explore new career possibilities, get a closer look at projects and position openings, all in an informal, no pressure atmosphere.

So, come to TECH FAIR and find 50 ways to leave your company. There's a TECH FAIR coming to your area soon.

OCTOBER TECH FAIRS**October 15 - 16****Long Beach Airport Marriott, Long Beach, CA****October 22 - 23****Grand Kempinski, Dallas, TX****October 29 - 30****Airport Hilton, Mpls, MN**

Free Admission

Hours: 3PM-8PM

TECH FAIR

THE NATIONAL JOB FAIR FOR ENGINEERING, COMPUTER & HIGH TECHNOLOGY INDUSTRIES

TECH FAIR is a Trade Show of Business Prospects for

Sponsoring companies

For information call (612) 370-0590. We are not an employment agency.

A Major Investment Firm Is Ready To Invest In You

Programmer/Analysts APS

Edward D. Jones & Company has over 1600 branch offices across the country delivering financial and investment services to the individual investor. Headquartered in St. Louis, Missouri, our data center has immediate needs for Programmer Analysts.

To qualify, candidates must possess APS (Application Productivity System from Sage Software), On-line Express and/or Program Painter experience; data base concepts; and excellent communication and organizational skills.

We offer an outstanding work environment including the most advanced technology and a solid commitment to new development. These positions offer rewards and recognition based on work performance, competitive compensation and benefits. Qualified candidates may call or forward their resumes in confidence to: **Human Resources/DP: EDWARD D. JONES & COMPANY: 201 Progress Parkway, St. Louis, MO 63043. Phone (314) 851-7204.**

Edward D. Jones & Co.*

Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Call Russell Bray, CP
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533
Specialist

TELEON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

AVAILABILITY, INC.
Dept. C, P.O. Box 23434
Tampa, Florida 33622
813 286-8800
FAX: 813-286-5747

WILCOX
COMPUTER PROGRESS UNITED
\$40,000 to \$50,000
We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist.

TELON
DB2 & IMS & CICS

Send resume or call
Computer Progress United
12730 Townpark Way
Louisville, KY 40243
(502) 245-6533

EDWARD D. JONES & COMPANY
Member New York Stock Exchange, Inc. and Securities Investor Protection Corporation

Computerworld Recruitment Advertising Works.

From our last two *Computerworld* recruitment advertisements alone, we hired a number of new recruits.

Renee Southard
Manager of Staffing & Placement
Keane Inc.

A project-oriented consulting company based in Boston, Keane Inc. designs, develops, integrates, and maintains software for both commercial and medical applications. Its largest operating unit, Information Services Division (ISD), provides customized services to Fortune 1000 companies, insurance firms, and financial institutions. KeaMed Hospital Systems Division (KeaMed), on the other hand, supports a full line of software products for hospitals.

To maintain its premier level of service, Keane employs nearly 1400 professionals in 20 offices throughout the East, Midwest, and Southeast. For Renee Southard, Manager of Staffing and Placement, Keane's aggressive growth plans require recruiting an average of 450 to 500 new employees each year.

"Although our recruitment needs vary from branch to branch, we're generally looking for a wide variety of skill sets — everything from programmers to systems analysts. Keane is always recruiting qualified candidates to fill specific positions, but we also advertise for marketing



purposes. That's why we've been running in Computerworld for over two years.

"Computerworld gives us the best of everything . . . exposure and qualified response. In fact, from our last two Computerworld recruitment advertisements alone, we hired a number of new recruits. With our current schedule of four or six Computerworld recruitment advertisements per quarter, we're getting the hiring success we need — where we need it.

"Computerworld continues to play a critical role in helping us find the right type of individuals and build up our pipelines. At Keane, we see Computerworld as an important part of our recruitment advertising — both now and in the future."

Computerworld. We're helping serious employers and qualified information systems, communications, and PC professionals get together in the computer community. Every week. Just ask Renee Southard. For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales Representative today.



COMPUTERWORLD

The weekly newspaper of record for computer professionals.

Boston: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700

New York: Mack Center I, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

Washington D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115

Chicago: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433

Los Angeles: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

San Francisco: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 250-0164

An IDG Communications Newspaper



Put your career on the map In Phoenix, Arizona!

Enjoy the best of both professional and personal worlds with CIBER in exciting Phoenix, Arizona. We are a progressive, growth-oriented consulting firm with excellent career opportunities for motivated individuals with a minimum of three years data processing experience in an IBM Mainframe environment. Immediate openings exist in the following areas:

COBOL
IMS DB/DC
DB2
DB2
DL/I, CICS
CICS

TELMON
HOGAN

We'll reward your expertise with a competitive salary and benefits package including relocation assistance. Arizona is a land rich in history with year-round sunshine and a variety of cultural and recreational activities. Put your career on the map by forwarding your resume with salary history to:



An Ethic of Excellence

CIBER, Inc.
Dept. CW60
300 N. Central Ave.
Suite 2000
Phoenix, AZ 85012
Call (602) 234-0411
Fax (602) 265-7185

An Equal Opportunity Employer M/F

We were struck by a great idea...

and the results have been electrifying. *Business Week* recently listed CISCORP as the 20th fastest growing high technology company in America during the '80's. Our great idea has been an aggressive approach to developing customized systems as a complete solution to your needs at a reasonable cost.

Strategic partnerships with prestigious hardware and software manufacturers have placed CISCORP on the leading edge of technology. Our extremely forward thinking environment specializing in relational database, 4th generation language application development and software engineering requires us to continuously seek top-notch Programmers/Analysts with experience in:

DB2, Advanced CICS, IMS/DC, AS/400, DL/I,

Control, Monitor or COBOL.

We offer limitless opportunity for personal and professional growth, as well as an excellent compensation/benefits program. If you are ready to bolt to our positive career environment, please submit your resume in confidence to CISCORP, Penn Center West II, Suite 430, Dept. 0171, Pittsburgh, PA 15276, Attn: Lisa Kustra, 500/963-0099 or 412/787-3070 (fax).

The vision of tomorrow's technology - TODAY

Atlanta • Baltimore • Cleveland • Dayton •

Philadelphia • Pittsburgh • Silicon Valley

An Equal Opportunity Employer

CISCorp

HAMAD MEDICAL CORPORATION

DIRECTOR OF HEALTH INFORMATION SYSTEMS

The Hamad Medical Corporation is a Government owned body responsible for the provision of free hospital services for the 3.67 million population of the State of Qatar. It manages three major hospitals which have a total of 1,100 beds and 4,200 Staff.

The Health Information Systems Department is responsible for providing a complete range of computing and information service covering all computing and administrative applications. The equipment environment includes a DG MV 15000 and numerous IBM compatible PCs.

We are looking for applicants who have a degree in computing, preferably masters level, and at least 10 years experience covering both a DG environment and hospitals.

Three year contracts are offered with tax free salaries and attractive fringe benefits including free furnished housing, paid holidays and annual air passages.

Applications with full cv. should be sent to the Director of Personnel, Hamad Medical Corporation, P.O. Box 3050, Doha, Qatar.

ROBERT HALF®

Specialized Recruitment For The Information Systems Industry



COBOL Programmer Analysts

Learn CICSI New CICS project requires 4 professionals with 2+ years of IBM OS/COBOL and CMS. Will be trained in CICS. Great work environment. To \$35K

IBM DB2 Consultants

- Robert Half Executive Big 6 consulting firm is building a DB2 consulting practice. Desire top DB2 professionals with minimum 3 years experience as DB2 DBA or in DB2 systems development. Both management and technical positions available. Travel or relocation required. To \$80K

MSA P/A's

Two positions with Fortune 100 company IBM MVS/XA DB2 environment to work on large Financial and Payroll projects 2+ years IBM OS/COBOL with MSA strongly preferred. INFO EXPERT a real plus. Will train in DB2. To \$45K

PC/LAN Specialists

Two Fortune 500 firms are looking for professionals with 2+ years PC/LAN technical hardware & software support experience with either NOVELL, BANYAN or 3COM networks. Opportunity for some travel. To \$45K

DEC VAX ORACLE Consultants

Multiple positions for VAX ORACLE programmers through systems designers with 2 or more years of ORACLE experience on ANY hardware. Both Vendor and Corporate positions available. To \$55K

Fast track RPG II Programmers and Programmers/Analysts with at least 3 years experience will be trained in RPG III/AS400. Excellent career. To \$32-35K

Alabama
Birmingham (205) 879-4000
California
Los Angeles (213) 393-6805
San Diego (619) 291-7990
San Francisco (415) 434-1900
San Jose (408) 293-9040
Torrance (213) 719-1400
Colorado
Denver (303) 628-1010
Colorado (203) 278-7179
Connecticut
Stamford (203) 324-3399
Trumbull (203) 961-8884
Florida
Ft. Lauderdale (305) 736-3811
Miami (305) 447-1757
Orlando (407) 422-2275
W. Palm Beach (407) 684-8500
Tampa (813) 221-7800
Georgia
Atlanta (404) 392-0540
Illinois
Chicago (312) 618-8200
Indiana Indianapolis (317) 638-8367
Idaho
Des Moines (515) 244-4414
Iowa
Iowa City (319) 261-3811
Michigan
Detroit (313) 962-3100
Grand Rapids (616) 956-9525
Minnesota
Minneapolis (612) 693-9585
Missouri
St. Louis (314) 727-1535
Kansas City (816) 474-5853
Nebraska
Omaha (402) 397-8107
New Jersey
Paramus (201) 543-3799
New York
Long Island (516) 332-2121
New York (212) 221-8500
Westchester (914) 682-8842
North Carolina Charlotte (704) 339-0550
Greensboro (919) 292-5313
Raleigh (919) 787-8226
Ohio
Cincinnati (513) 621-7711
Pittsburgh (412) 271-5946
Oklahoma
Oklahoma City (405) 236-0880
Texas
Dallas (214) 363-3300

To \$55K

To \$32-35K

COMPUTER CAREERS

MIT

3D Graphics Software Engineer

Laboratory for Computer Science

The MIT X Consortium is seeking a creative individual with 3D graphics experience to help develop, optimize, and enhance PEX, the PHIGS extension to the X Window System. Responsibilities cover the entire PEX implementation, including the PHIGS client library, structure storage, input monitor, and complete software rendering pipeline.

Requirements: Applicants should have a Bachelor's degree or equivalent combination of education and experience, good C programming skills, some X programming experience, and a good grounding in 3D graphics, with direct experience in implementing 3D graphics algorithms. Experience with PHIGS, PEX or X server internals desirable.

Interested candidates should submit two copies of a resume and cover letter referencing Job No. R90-185 to: James H. McCarthy, MIT Personnel Office, Bldg. E19-239, 400 Main Street, Cambridge, MA 02139.

MIT is an Equal Opportunity/Affirmative Action Employer
MIT is a non-smoking environment

Massachusetts Institute of Technology

Are You Scared of the Dark?

Stephen King-ish nightmares of a recession? Baldreich! Our clients have over 200 great career opportunities located throughout the United States. We need TECHNICAL PEOPLE, and small-team leaders with the following qualifications:
 • TCC: Life 70, Lifecom CCA, CUPS or Psalm, Vantage - P/A's, Engineers, Analysts. As little as one year Life 70, Lifecom, CCA, Lifecore, and heavy demand. To 65K+ for top experience in TCC products.
 • Assembly coding skills, 2-8 years. Insurance background helpful. To 40K.
 • Systems programmers, P/A's, and Project leaders. To 55K. Insurance Business System's Analysts - non-management. To 55K.
 • IDMS, DB2 and some IMS: DB analysts, programmers, P/A's. To 65K for top experience.
 • Application programmers, programmers, P/A's. Opportunities in Carolinas, Virginia, Georgia, Florida, California, Texas, throughout Midwest, some Eastern. The demand for TECHNICAL NON-MANAGEMENT personnel is VERY HIGH. All candidates should be open to relocation, serious about moving, and have the desire to work "hands on". We are a Technical Search firm, specializing in MIS and DP. Companies assume our fee and expenses.
 Call John Heckers at 1-800-441-5388 or fax your resume to 1-800-443-5388.

Consulting, Inc.

COMPUTER PROFESSIONALS

Professional, well-established, computer consulting and service firm is seeking independent computer professionals for contract opportunities. Minimum 3-5 years experience in business, process control, or engineering applications.

IBM, MVS/TSO, VM, DEC VAX, WANG VS, or Macintosh environments. Assignments available immediately for individuals with proficiency in any of the following areas:

RE: LOTUS, DBASE, DB2, COBOL, FOCUS

Send resume stating specific hardware, software and three references to:



ComRim Systems, Inc.
560 East 34th Avenue, Suite 200
Anchorage, Alaska 99503
Phone: (907) 563-4964
Fax: (907) 563-7435

SYSTEM SOFTWARE DEVELOPERS

PRODUCT SUPPORT

IBM ASSEMBLY AND

ETHER VM MVS I MS

DB2 PL/I COBOL

NON-TRAVEL JRS

SOFTWARE DEVELOPERS

STRONG IBM ASSEM

BLY MVS AT LEAST 3 YRS

SUPERVISOR LEVEL 289

IMS VTAM VM OR MVS

INTERNAL ALIAS

SALARIES TO \$80,000+

MULTIPLE LOCATIONS

ROBERT SHIELDS &

ASSOCIATES

P.O. Box 890723, Dept. S

Houston, TX 77289-0001, J.O.

NUMBER 5424693. This advertisement was paid by an Equal Opportunity Employment Employer.

Network Support Specialist

Level II - \$1932 - 2350
Level III - \$2205 - 2803

Fresno County's Computer Services Department is recruiting for experienced Network Support Specialists to monitor and support network processing systems including personal computers & word processors, install & maintain local area networks, review configurations in user departments & restore network & system problems. Data communication and hardware installations. PC LAN or Wang expertise is preferred.

Fresno is a growing community where one can enjoy a good quality of life at a low cost. Fresno offers an extraordinary quality of life with a short commute time. Our central location provides easy access to three national parks in addition to San Francisco, Los Angeles and Sacramento.

We offer 30 paid days off the first year of employment and a competitive benefits package. If you are interested in part-time or full-time professional growth please call with application materials: (209) 488-3364, Fresno County Personnel, 14th Floor, 2200 Tulare Street, Fresno, CA 93721. EEO/AH/HANDICAP EMPLOYER. Application deadline: Friday, November 2, 1990 at 5:00 p.m.

SENIOR ACP/TPF SOFTWARE ENGINEER required. Will Work in the Systems Engineering Department on the analysis and design of real time systems. Maintain and support the implementation, accessibility and availability of all real time systems information and databases. To be utilized in writing ACP/TPF, BMS, Basic Assembler Language and the test tool development language CMS (Computerized Monitoring System). Applicant must have a minimum of a Bachelor's Degree or its equivalent in Computers, Math or Engineering with at least four years ACP/TPF, BMS and CMS (Computerized Monitoring) programming experience must be in the area of real time software systems design and not merely in real time applications programming. Annual salary will be \$45,000/year for a 40-hour work week. Additional salary up to \$50,000/year may be paid if additional experience is warrant. Must have proof of legal authority to work in the United States. Interested applicants contact the Oklahoma Employment Security Commission, Dept. 2002, 3105 E. Skelly Drive, Tulsa, Oklahoma 74105-7202. Phone: (918) 749-6861. Refer to job order number 091281. Ad paid by an Equal Employment Opportunity Employer.

MAINE - NH \$25,000 - 50,000 Salary

ROMAC, the largest and oldest placement agency in this area, is seeking qualified data processing professionals with salary requirements in the \$25,000-\$50,000 range. Our clients pay our fees.

ROMAC
At: Dept. 2
P.O. Box 7040
Portland, ME 04112
(207) 773-4749
FAX (207) 773-2645

PROGRAMMERS:
Contract Assignments
\$24-28/Hr.
+ Per Diem.

Jr. to Sr. level programmers with 1+ yrs exp in IBM C, PL-1 ASSEMBLER & other high-level languages. Contract assignments 12-18 mos \$24-28/Hr. + per diem.

Contact: Al Medina, C.E.C. CORPORATE PERSONNEL CONSULTANTS, INC. P.O. Box 7040 Clatskanie, OR 97022 (704) 366-1800 FAX (704) 366-0070

UNISYS

Programmers, Analysts, DBA's and P/L with experience in:
 • 1090, 2200 Mainframes
 • AS/400, DB2, TSO, COBOL,
 • MAPPER, MASM or USA3,
 • A/V/I Mainframes
 • Any: DMS II, COBOL, ALGOL,
 • LINC, COMS, MISER or MCP
 • Banking, Retail, Distribution,
 • Mfg., Health Care, Insurance,
 • MSA or Financial applications.
 • Perm, placement in the U.S.A.

COMPUTER STAFFING
call 800/88UNISYS

GET OUT OF TOWN NATIONWIDE OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY COMPUTER COMPANIES, BUT CAREER OPPORTUNITY, THE COMPUTER-TECH NETWORK OF 80 MEMBER COMPANIES IS THE PLACE TO GO. AGENCIES SPECIALIZED IN THE PLACEMENT AND PAID RELOCATION OF COMPUTER PROFESSIONAL PERSONNEL TO ALL AREAS OF THE U.S.A.
 (216) 356-9990
 FAX (216) 356-9991
 TOLL-FREE 1-800-752-3674

COMPUTER TECH NETWORK
21010 Center Ridge Rd.
Rocky River, Ohio 44116

PROGRAMMERS DEC VAX CONTRACT & PERMANENT SAN FRANCISCO

Excellent opps. for DEC VAX professionals in SF/Bay Area for the following areas:

VAX COBOL - Proj. Analyst
 VAX Systems Manager
 McCormick & Dodge
 VAX Powerhouse
 VAX COBOL
 EDI Guru

For immediate consideration please call and send resume to ADP #47:

415-387-3225
 ICC, Inc.
 41 Sutter Street, CA 94104

When you compare costs and the people reached, Computerworld is the best newspaper for recruiting qualified computer professionals. Place your ads today!

Call toll-free
 800-343-6474
 Or In Mass
 (508) 879-0700

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you the unique option of REGIONAL or NATIONAL recruitment advertising.

Whether you want to run your ad in the Eastern, Midwestern, Western, National, or any combination of regional editions. Computerworld gives you the only regional recruitment advertising section available in the United States exclusively for computer professionals. And no other newspaper or magazine reaches so many qualified computer professionals regionally or nationally!

Computerworld's Total Audience by Region



SOURCE: Audit Bureau of Circulations Supplemental Data Report, May 1987.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



COMPUTERWORLD

Where the best hires look. Every week.

Business Applications Computer Engineer, 40 hrs/wk. 5:00am - 9:00pm, \$751.93/wk. Duties: Design, develop, implement and test customized complex information systems. Applications include: financial management, switching systems, computer graphics, image processing, Troubleshooting specific hardware and software problems. Total compensation package includes: Tuition CUNIK, Sun Workstation, SAS/Assembly, MS in Computer Science as well as 4 years experience as a Business Applications Computer Engineer. A Computer Computer Engineer required. Previous experience must include database management, image processing, and modeling. Previous experience with SAS also required. Graduate course work must include: Concurrent Computer Systems, Computer Architecture, and Real Time Systems. Must be able to fluently speak, write and read French and English, including current colloquiums, idioms and jargon. Previous experience in what it pertains to business usage. Six months work experience in localization of business automation products for French market. Must be able to demonstrate ability to work in the United States. Job location: Seattle area, Washington. Salary: \$33,500-36,000 per annum, depending on experience. 40 hours per week, flex time. EOE

PROGRAMMER/ANALYST: Will design, develop, test, and analyze a CICS program to convert present computer systems into an IBM on-line system using database programming. Will use PL/I language or an IBM mainframe hardware with OS/VS2 operating system to effectuate necessary results. Will develop a data conversion development system for major manufacturer. Requirements: Bachelor's degree in Computer Science or Major in Mathematics with a major in Computer Science. Also require one year experience in the job to be performed or one year experience in a Research Project. Entire experience must include using PL/I in an IBM on-line system implementing CICS program. Hours: 8:00 a.m. - 5:00 p.m. 40 hours per week. \$30,000-\$35,000 per year. Please send resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, IL 60605. Attention: Reference #V-L-1730-M. NO CALLS, AN EMPLOYER PAID AD.

Sai Software Consultants, Inc.
Sai, one of the fastest growing contract programming and consulting firms, has immediate openings for talented programmer/analysts. We are looking for:

UNISYS MAPPER
COBOL
MICROFOCUS-COBOL
AS/400, SYNTH
C, RATIONAL
IDS, ODS, AOS/A
DEC VAX/PDP
APPS, DB2, CICS

Please call, fax or mail resume to:
Sai Software Consultants, Inc.
2330 Timber Shadows Dr. 2021
Kingwood, TX 77339
1-800-365-2748
(713) 358-1858
Fax (713) 358-4855

SYSTEMS ANALYST at major university computer center to develop database and network software, provide technical consultation on a variety of database systems, and teach courses in use of microcomputers. UNIX-based high performance workstations and VAX systems, and teach software workers. Job responsibilities include: analyzing user requirements for networks and systems, then designing and implementing networks and systems to meet user requirements. Applicants must have master's degree in computer science with experience in networks, distributed systems, and databases, and working as graduate student. Additional requirements: Network protocols: ISO, OSI, TCP/IP and RPC. Practical experience in developing databases as graduate student. Database software: DB2, SQL, Oracle, Paradox, and FoxBase. Programming languages: COBOL, Fortran, C, COBOL, FORTRAN, systems: DOS, OS/2, Macintosh, UNIX and VAX/VMS. Salary: \$23,100/year. Contact: Kathy McCall, Dept. C, Order Dept., Job Serv Proj & Tech Supp, TN Dept of Employment Sec., Nashville, TN 37245-1200.

Programmer/Analyst-Oak Brook, IL: Respon for analysis, design, development, implementation & maintenance of business systems. Provide technical support. Utilize DEC, VAX hardware; VMS operating system; COBOL with IMS, DCL, DATA-RETRIEVE, languages, 2 yrs/ exp. doing above. 40 hrs/wk. \$44,000/yr. Send resume only to: IL Dept of Employment Security, 401 South State St. - 3 South, Chicago, IL 60605. Att: Connie Evans. Reference #V-L-1158-E. AN EMPLOYER PAID AD.

Software Localization Manager for France, International Product Group. By November 21st please apply to: Mr. Eric S. Security Department, ES Division, Attn: Job # 230486, Olympia, Washington 98504. Job Description: Manager responsible for a company to locate U.S.-designed and produced software for microcomputers to French market. Works with software engineers and international partners to translate designs. Manages localization associates, computer marketing specialists, software market analysts, translators, writers, printers, and marketing personnel to produce French manuals and marketing material to accompany Multilingual software. Communicate with companies in France re software and marketing needs. Requirements: B.A. Business Administration with specialization in Marketing or Economics. Must be able to fluently speak, write and read French and English, including current colloquiums, idioms and jargon. Previous experience in what it pertains to business usage. Six months work experience in localization of business automation products for French market. Must be able to demonstrate ability to work in the United States. Job location: Seattle area, Washington. Salary: \$33,500-36,000 per annum, depending on experience. 40 hours per week, flex time. EOE

Hardcore Software People

We need analysts/programmers for IBM or DEC environments. According to Inc. Magazine WTW is a 130 of America's top 100 growing companies. Join our team and earn what you're worth. WTW is a national software company with excellent salary and benefits and the opportunity to position yourself for success.

Call immediately or send resume:

1-800-533-2884

Attn: Skip Marsh

Wells P.O. Box 10000 Research Triangle Park, NC 27709-2214

Wesson, Taylor, Wells is an equal opportunity employer



Computer Specialist

Assists with administrative and instructional computer support in a networked PC and mainframe environment. Responsibilities include programming and systems analysis; hardware and software installation management and maintenance; and user support and training. Supervises student lab assistants. Bachelor's degree required. Apply before November 2, 1990, to Larry Dodge, Dean of Administration, Eastern Wyoming College, 3200 West C Street, Torrington, WY 82240. EWC is an EEO/AA Employer.

CA & AZ CONTRACTS

CONSULTANTS WANTED



P. Murphy & Associates, Inc.
4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(318) 841-2002 (714) 552-0506
FAX: (318) 841-2122

HOGAN Hiring Bonus

Immediate needs for employees and contractors with experience in:

- HOGAN LOANS
- ODS
- PAS

Computer Experts offers competitive salaries, six-month reviews, medical, dental and life and disability insurance. Call and resume to: Computer Experts Inc., 2 International Drive, Suite 210, Nashville, TN 37217. (615) 367-1866.

SUNBELT & ATLANTA
\$25,000 to \$95,000
IDMS/ORACLE/DATACOM/IMS/DB2
VAX/MAPICS/FOCUS/SYS38/AS400
BAL/PLI/DP SALES/TANDEM
Need Programmers, Programmer Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:
Jim Heard, EDIP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062
FAX: 24-HOURS
404-973-4052 or
404-977-8223
PHONE:
404-971-7281

SULTAN QABOOS UNIVERSITY COMPUTER CENTRE SULTANATE OF OMAN

Applications for the post of DEPUTY DIRECTOR FOR SYSTEMS SOFTWARE are invited. Applicants should be highly experienced in Systems work with products like VM, VSE, SNA, CICS, VTAM, SQL and ORACLE. Salary and benefits will be commensurate with qualifications and experience.

Further information is available from the Computer Centre Director, fax +(968) 513254. Phone +(968) 513220. Resumes should be sent to the Personnel Affairs Officer, Sultan Qaboos University, P.O. Box 32500, Al-Khad, Sultanate of Oman.



SAN FRANCISCO BAY AREA

Please note ... Our clients have new and exciting openings with the following skills:

- ORACLE Applications Programmers, Designers, Data Base Development Programmers, Analysts
- AS-400 Systems Programmers, Systems Administrators
- C/UNIX Systems Programmers
- CICS/Banking Systems Analysts, Programmers

THE FIRM, INC.
595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

PROGRAMMER/ANALYST II UNIVERSITY OF CALIFORNIA, DAVIS

Provide analysis and programming for implementation of the SGT ORACLE based Student Information System. Adapt and install the software package, design, program, test, and document additional custom requirements.

Requires extensive knowledge of large scale integrated application systems, preferably student related. Experience with SGT Banner Student Systems Package or ORACLE a plus.

Monthly salary of \$2,725.00 - \$4,083.33 depending upon experience. A program supplemental application form is required.

Apply to UC Davis, Employment Office, TB 122, Davis, CA 95616 by 11/5/90 for Programmer/Analyst Job # 1281. For required application material call (916) 752-0531, M-F, between 10:00 a.m. and 2:00 p.m.

EDE
UC DAVIS

FLORIDA

We are Romac & Associates, specialists in the data processing industry. Currently our technically sophisticated clients have requirements for:

- PROGRAMMER ANALYSTS
 - SYSTEMS PROGRAMMERS AND OTHER MIS PROFESSIONALS
- WHO HAVE EXPERIENCE IN ANY OF THE FOLLOWING AREAS:
- IBM-MVS
 - CICS
 - COBOL
 - ASSEMBLER
 - TANDEM/TAL
 - COBOL
 - DB2
 - UNIX
 - INGRES
 - HP/NX
 - PL/I
 - CASE TOOLS

Our clients offer top salaries and a perfect climate. Please send your resume or call any of our consultants.

I Harbour Place #880C
Tampa, FL 33602
(813) 229-5575

ROMAC

Professional Recruiters
All fees are assumed by our client companies.

PROGRAMMER ANALYST: Management Information Systems. Will design, plan, install computer information systems for use in inventory control, job costing, invoicing, & payment of bills of material. Set up a service center through point of sale entries within the mall order division for a wholesale nursery. Will analyze paper flow and develop different alternatives to insure proper flow of information to all necessary departments & management. Develop & prepare analyses of company's business productivity, sales & sales forecasting, & analysis of inventory & cost for presentation to management to be used for the purpose of anticipating future business needs. Will use & integrate IBM MS-DOS, Macintosh & UNIX systems, mainframe computers, terminals. Requires M.B.A. degree with major field of study in Management Information Systems. Education to include 6 months as Research Analyst. Minimum of 2 years experience in IBM VM/CMS, MOS-DOS & IBM Compatible & Macintosh Systems environment. Education to include completion of course in Agricultural Development. Hours: 8:00 a.m. - 4:30 p.m. 40 hours/week. Starting salary: \$13,480.00 per month. Please send resume to: Illinois Department of Employment Security, 401 South State St. - 3 South, Chicago, IL 60605. Att: Connie Evans. Reference #V-L-1158-E. AN EMPLOYER PAID AD.

OCTOBER 22, 1990

Exciting Opportunities In State-Of-The-Art Software Development

Community Health Computing has served the medical community with software solutions since 1973. CHC offers career opportunities associated with the introduction of new technology into its new and expanding product line development activities. We are seeking Software Engineers for positions in the Product Engineering Department with the following skills:

APPLICATIONS DEVELOPMENT

C, UNIX, Relational Database, Graphical User Interface

COMMUNICATIONS DEVELOPMENT

OSI, LAN, SNA, TCP/IP, X.25, X.27

Be a vital member of our growing team in Houston — where the spirit of optimism is driving a comeback economy. You'll enjoy no state income taxes, a highly affordable cost of living in a vibrant, international city. Our benefits include medical/dental insurance, flex account, tuition reimbursement, 401K and relocation assistance. Send your resume to:

COMMUNITY HEALTH COMPUTING

Director of Human Resources
5 Greenway Plaza, Suite 1900
Houston, TX 77046



U.S. Citizenship Required

An Equal Opportunity Employer

SAUDI ARABIA/U.S. OPPORTUNITIES

Tax-Free Salaries. Free housing, medical, dental, transportation.

SYSTEM ANALYSTS

COBOL,IMS,DB,DCJCL,BTS

EDP SYS ANALYST

ORACLE,HYPERCAD,Macintosh XIS Modules,Display Technique

SYSTEM ANALYST

10 yrs. exp. BS Degree

DOBIS/LIBRIS/OPAS/EUXX/BMFP, PL,I,CICS,JCL,TSO,ISPF,MARK IV, CLIST/REXX.

HARDWARE MAINT ENG

7 yrs exp performing fault diagnosis.

Interpret digital system performance.

SYSTEM ANALYST

IBM, CICS, MVS, COBOL, PL,I, SAS, SPSS,IMS, Microsoft Word, Windows, and Excel.

DIGITAL SYSTEMS TECH

4 yrs exp performing fault diagnosis.

Preventive maintenance, planning.

Interpret digital system interface.

TRAINING ANALYST

3 yrs exp with tech degree. Write procedure,instruction,sched tracking.

SYSTEM PROG/ANALYST

10 yrs exp with BS Degree.

IBM DF/HSM,DF/SMS,DASD Cache Mgmt, 3391/3990 DASD controllers.

PC INSTALLER

5 yrs exp with Tech Degree.

Install,Lan,Printers,IBM DOS, WINDOWS, LAN', WordPerfect.

EDP SYSTEM ANALYST

2 yrs exp with Tech Degree.

System support, programming, bidg maint., facility support.

Send Resume and Salary History to:

THE LESLIE CORPORATION

400 East Sam Houston Parkway North, Suite 701C, Houston TX 77060

FAX (713) 591-0921

SSG SOFTWARE SUPPORT GROUP
1460 West 9th St., Room 800, Cleveland, Ohio 44113 (216) 566-0555, FAX (216) 791-0555

CONSULTING

DATA COMMUNICATIONS & TECHNICAL SUPPORT PROGRAMMERS

EXCEPTIONAL OPPORTUNITIES EXCELLENT SALARIES / FULL BENEFITS / TRAVEL

Software Support Group, an international technical consulting firm, has several immediate openings for highly skilled technical support specialists.

Technical Support Programmers: Experience should include 7+ yrs. of MVS (SP/XA/ESA) as well as experience with a wide range of system support and mgmt. control products. Ideal candidates will possess experience with multiple op. sys. (MVS, VM, VSE).

Data Communications: Experience must include data and voice WANs utilizing using copper, fiber, microwave, & satellite system. Complete experience from the NCP out needed. Additional experience with VTAM, NCP, CICS would be a plus.

All candidates must possess exceptional interpersonal & communications skills required & be available for national/international travel. Relocation not required.

Call or send resume to Mr. David Rosemont, c/o Software Support Group
1460 W. 9th St., #800, Cleveland, Ohio 44113 (216) 566-0555.

COMPUTER CAREERS

DB2 AS/400 CASE

ESA is assisting high-growth corporations and entrepreneurial-run companies with their systems requirements. Positions available immediately are first-rate contract programmers and systems consultants:

- AS/400 Developers
- DB2/CICS Appl./Programmers
- COBOL/BASIC
- KnowledgeWare
- COBOL/CSF Programmers

Salaries \$72-120K DOE. For immediate and confidential consideration, phone/fax/write:

Mr. Wendell Maness, EVP
Enterprise Systems Assoc.
7041 Koll Center Pkwy.
Suite 260
Pleasanton, CA 94586
Ph: (415) 846-4256
Fax: (415) 846-7925

esa Opportunities Nationwide!

PROGRAMMER/ANALYST, DATABASE: Will design, develop, model, and test a telecommunication system operating support system. Will use statistical analysis for Network performance evaluation. Will use SAS tool to analyze experimental simulations. Will implement in SIS/SIS switch databases. Will use embedded SQL language to develop and modify the code supporting SIS/SIS telecommunication system. Will maintain system in UNIX operating system. Will plan and implement a system oriented test plan. SIS/SIS system configuration management system by exercising feature configuration and generation functionalities. Requires U.S. or Canadian in Computer Science. Also requires one year experience in the job to be performed or one year experience as a Programmer/Analyst in any field. Education to include completion of coursework as follows: one course in database management, one course in two courses in networking, one course in database programming, one course in data communications, one course in data structures, one course in terms modeling. Education to include completion of a project in database design and C language. Hours: 8:30 a.m. - 5:30 p.m. 40 hours per week. \$35,000-\$40,000 per year. Please send resume to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, #1870-D, 401 South Dearborn Street, Chicago, Illinois 60605, Attention: L. Donegan, Reference: #1870-D. NO CALLS, AN EMPLOYER PAID AD.

SENIOR UNIV/ SOFTWARE DEVELOPMENT ENGINEER required. Design, development, testing and implementation of graphics tools and applications and systems real-time data acquisition and monitoring products under a UNIX and C environment using X Windows and Industry Standard MDTIF. Systems to be designed include graphics and graphical user interfaces, productivity tools and real-time data acquisition and monitoring software. Design will be of tools and systems that will assist programmers and operators in developing advanced application programs and in implementation of data acquisition products. Applicants required to have minimum of 5 years experience in Computer or Engineering and at least four years experience with Software Development in a UNIX environment. The top candidate must include at least two years of work with industry standard Graphics Interfaces and at least one year of design experience in the environment. Annual salary will be \$46,000/year for a 40-hour work week. Additional salary up to \$10,000/year may be paid education and experience bonuses. Interested applicants apply at the Texas Employment Commission, 100 W. Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78788-0001. J.O. number 5000. This advertisement was paid by an Equal Opportunity Employment Employer.

DP PROS NEEDED NOW

TANDEM
All levels of experience sought worldwide

DATABASE PROS
IMS, DB2, IDMS, ORACLE,
INGRES

MIDRANGE SKILLS
S/38, AS/400, RPG OR COBOL
Contact Electronic Search, Inc.
3601 Algonquin Road Ste. 201
Rolling Meadows, IL 60008
(708) 508-5700
Fax# (708) 508-9999

Workstation Sales Engineer responsible for the District sales and technical support of high-performance RISC and CISC based Engineering workstations. In both a DOS and UNIX operating environment. Work with new product releases to ensure proper design techniques and software applications are used in product development. Prepare technical market maps for Electrical, Mechanical and Software Engineering market segments. Develop and maintain product positioning and technical requirements for product acceptance. Use both VMS and Unix workstations to perform system evaluations and user simulations for performance characteristics. Prepare detailed test reports and present the product to customer approval. Use both VMS and Unix workstations to perform system evaluations and user simulations for performance characteristics. Prepare detailed test reports and present the product to customer approval. Develop expertise in workstation-based applications in an industrial environment in stand-alone, NFS environments utilizing TCP/IP protocol or LAVC environments utilizing DECnet. Requirements are as follows: 1. Experience in Electrical Engineering; knowledge of computer systems in hardware and software design. Unix, VMS, Networking modes, protocols and performance evaluation. Background in software development and knowledge of workstation applications and interface design as required. Salary: \$75,000.00 per year. 40 hrs/week. If you are interested in and qualified for the above position, please send your resume to Job #128, G. Allen, 2525 Augustine Drive, Santa Clara, California 95054-3039.

**MEDICAID/
HEALTH
CLAIMS
PROCESSING**
Long-term consulting assignments available throughout the country for experienced Medicaid/Health Care Claims Processing Programmers and Analysts. 3-5 yrs related exp. necessary. IDMS/ADDS openings also available. Please call or fax resume:

**THE LENO
PRO**
318 Bear Hill Rd, Suite 2
Waltham, MA 02154
617-890-7555
617-890-0904 (fax)

Programmer Staff: Resp. for designing & developing advanced multi-language computer programs. Must have extensive background in traditional Chinese language, utilizing 386 architecture language systems & MVS/VMS Operating Systems. Proficiency in various languages, prefer for various code pages. Perform research in AI subfield, Logic Programming & Natural Language Processing. To facilitate communication with clients, must be fluent in English. Must publish results of original research both in scholarly journals & tech. publications of company's design. Must be able to work in a related field, demonstrated theoretical & analytical understanding of Logic Programming & Natural Language Processing. Must be able to publication of 2 articles in scholarly journals in area of Logic Grammar. Knowledge of formal language theory, parsing, theorem proving, logic programming & logic grammar including Prolog as evidenced by at least 2 yrs. research in Logic Programming & Natural Language Processing. Proficiency in knowledge of traditional Chinese Characters. 40 hrs/wk. \$55,000/yr. Job & interview site: San Jose, CA. Send resume to our advertising job #CP19103, P.O. Box 9560, Sacramento, CA 95823-0560 not later than 11-6-90.

Computer Programmer/Analyst, Bach. deg. Comp. Sci. + 1 yr exp. Knowledge of "C", MS-DOS, & DBMS req'd. Be responsible for creating a program or a series of programs that controls a computer application system. Responsible for all aspects of development, testing, and documentation of System Projects. Develop & prepare all documentation of program implementation. Install & Implement systems. Design & Implement new software to further enhance systems. Code, test, debug & document programs. Maintain program, providing technical assistance to the end users. Train & prepare training material for users of the program. \$30,000-\$40,000/yr. Send resume in duplicate to Illinois Dept. of Employment Security, 1008 W. Univ. - Box 549, Urbana, IL 61801. Attn: Helen Vedder, Ref. #1920-B. An Employer Paid Ad.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld recruitment advertising has a proven success record.

Just ask Linda Heubscher, Manager of Employment for a division of Unisys.

It's her job to make sure that her division has the most qualified and technically trained personnel on its team. And for the most successful recruitment of these top computer professionals, Linda counts on Computerworld: "Our ads in Computerworld had the resumes pouring in and the phones ringing."



Or ask any one of the hundreds of companies who regularly use Computerworld to recruit qualified computer professionals. They'll tell you they advertise in Computerworld for one simple reason: It works.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700)**.



COMPUTERWORLD

Where the best hires look. Every week.

"Our advertising in Computerworld's Classified Marketplace more than pays for itself."

— Mark Ostroff
President & Partner
Compurex Systems, Inc.



Headquartered in the Boston area, Compurex Systems is a distributor of new and reconditioned IBM and Digital equipment. With a product line that includes everything from systems and disk drives to printers and other peripherals, it has a lot to offer large end users. President Mark, "Rocky" Ostroff, along with his two partners, Christopher Pernock and Jack Malamut, face the challenge of finding everyone who has something to sell or is looking to buy. When it comes to advertising, they're on the right track.

"We need to get the Compurex name out to a broad base of prospects in a variety of industries. And we need to tell them about all of our programs — buying, selling, trading, leasing, and consignments. We believe that most people who buy/sell concentrate on the classified section. It's where they look first. For us, Computerworld's Classified Marketplace is where our message gets delivered to the largest and most diverse audience of potential customers.

"Since we founded Compurex Systems in 1986, sales have doubled each year. To maintain this momentum, it's critical for us to continue generating quality leads. Our weekly ad in Computerworld's Classified Marketplace keeps a steady stream of calls coming in — even international calls. Based on these results, our advertising in Computerworld's Classified Marketplace more than pays for itself.

"In early 1990 we'll be moving our expanding business to larger quarters — from Stoughton just up the road to Easton. But one thing won't change: our weekly advertising schedule in Computerworld's Classified Marketplace. That's where we'll stay to keep the calls coming in."

Computerworld's Classified Marketplace. It's where computer buyers meet computer sellers. Every week. Sellers and buyers like Compurex Systems who advertise in Computerworld's Classified Marketplace because it reaches over 612,000 information systems professionals. And because it works. To put your classified message into the hands of America's most powerful audience of buyers, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



COMPUTERWORLD CLASSIFIED MARKETPLACE

Where all computer buyers and sellers can go to market.

Computerworld is an IDG Communications Newspaper

MARKETPLACE

Computer leasing in Europe: Getting a handle on the rules

BY NORM BARTLETT
SPECIAL TO CW

During the past two decades, European computer leasing companies have undergone a transition similar to those in the U.S. The free-and-easy entrepreneurial approach of the '70s gave way to the mergers-and-acquisitions era of the '80s. Because of this shift, leasing firms of the '90s are following stock exchange disclosure rules more strictly and adopting more traditional accounting practices. What follows is an overview of leasing procedures — European style.

Banks, which play a much larger role in European leasing than in the U.S., control several computer lessors. These firms have handled changes in the computer marketplace with confidence because of ready access to substantial funding from the owning banks.

Leasing in most European countries ranks alongside bank borrowing and other forms of medium-term credit for financing. Thus, leasing companies are offering attractions to the customer such as planning, software applications, maintenance and other things competitors can't offer.

Operational leasing — leasing for a fixed period without obligation to purchase — has steadily become more popular than financial leasing. Operational leasing is preferred at times of business

uncertainty or when new products are expected from computer suppliers.

Finance charges are a big factor in European leasing rates. These differ widely from country to country. Rates are partly determined by national economic policies as a means of controlling money supply

European leasing facts

- In 1989, European users spent approximately \$55 billion on computers and equipment — 17% of which is attributed to leasing companies, according to New York market research firm Frost & Sullivan.
- Europe's largest lessor is IBM, followed by Hewlett-Packard Co., ICL and Nixdorf Computer Corp.
- The most significant U.S.-controlled computer lessors in Europe are Bell Atlantic Corp., Bellsouth Corp. (Dataserv) and Comdisco, Inc.

(thus, inflation) and exchange rates (thus, international competitiveness). These aspects affect the level of economic activity through availability of credit, price of exports on the international market and cost of imports on the domestic market.

The largest independent lessor in Europe until April 1990 was Atlantic Com-

puter. In that month, the chickens from its controversial "flexlease" scheme came home to roost, and the receivers were called in. The collapse was big enough to sink its parent company, British & Commonwealth Holdings. The biggest European independent leasing company now operating is ECS, a subsidiary of French bank Societe Generale.

Belgium is one of the few countries that has a clear legal basis for leasing, restricted to industrial products used in the way of business. Office equipment and computers make up about one-third of all leasing. The largest leasing firms are subsidiaries of the Big Three Belgian banks.

French leasing is strictly supervised. Firms involved must be banks or other qualified financial bodies, although operating leases are entirely outside the regulated French leasing business.

The Finanzministerium lays down detailed rules for leasing in Germany. For example, a lease must last for at least 40% and not more than 90% of the depreciated life of the asset. The life of the asset is laid down in the federal tax tables, which list the depreciation rates for virtually every type of equipment that a firm could acquire. For a computer, it is five years.

In contrast to the general tendency in other countries for operational leases, Italian firms prefer financial leases. Vendor leasing is quite important in the office equipment sector, where Ing. C. Olivetti & Co. dominates the market.

The Dutch take a pragmatic view of leasing and consider economic benefit to be more important than legal ownership.

The fiscal advantages of leasing have been steadily draining away in the Dutch market since 1986, so that there has been no dramatic growth in leasing.

The conduct of the Spanish leasing market is still dominated commercially and financially by banks and banking subsidiaries. Because Spanish firms are very anxious to copy the successes of firms in other countries, computer leasing has experienced rapid growth.

A major problem that Swedish leasing firms have faced in recent years has been the blow-hot, blow-cold attitude of the government. In 1983, after almost trebling from the previous year, leasing came in for a period of control, which caused the business to halve in 1984. Regulations were relaxed in 1985, and leasing expanded.

Leasing was slow to become accepted in Switzerland mainly because of conservative attitudes of financing.

The UK was a boom town for fast-growing leasing companies in the 1980s. The rise and fall of Atlantic Computers says it all. British leasing in the future will be dominated by suppliers and banks.

This verdict on the UK is true of the continent as a whole. As the Open Market of 1992 approaches, the European Commission will be imposing rules on the tax and accounting treatment of leases, which will strengthen the role of bankers and other institutions even more.

Safer, but far less exciting!

Bartlett is a researcher and journalist based in Chelmsford, England, who specializes in European computer topics.



Buy/Sell/Lease

COMPUTER ROOM EQUIPMENT

LIEBERT

Computer Room Air Conditioners
3 thru 22 Ton Units
Main Frame Chillers
3 thru 12 Ton Units
Power Distribution Units
30 thru 225 KVA

PILLER

40 & 75 KVA Silentblocks

LIEBERT, EXIDE, EMERSON EPE & IPM

18.75 - 556 KVA UPS Systems

RAISED ACCESS FLOORING

Thousands of square feet in stock,
wood and steel.

All items listed are reconditioned with warranty



DP SUPPORT
P.O. Box 1409
Plano, TX 75068
214-422-4551
214-576-1236 Fax

Go Shopping in...
Computerworld's
CLASSIFIED MARKETPLACE

Call for all the details
(800) 343-6474
(in MA, (508) 878-0700)

IBM SPECIALISTS

SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742

- * New and Used
- * IBM Maintenance Guaranteed
- * All Peripherals
- * Immediate Delivery
- * Upgrades and Features
- * Completely Refurbished

800-251-2670

IN TENNESSEE (615) 847-4031



PO BOX 71 • 610 BRYAN ST. • OLD HICKORY, TN 37138

FOR SALE

FPS Computing System Model 64/164

Will configure with Disk, Memory & Max. Boards to meet your needs. Other FPS Computing Systems available

International Computing Systems

800-522-4272

Fax: 612-935-2580

FOR SALE

Buying used IBM equipment:

- > 3380 - Disk
- > 3480 - Tape
- > 3880-X23 - Cache Controllers (any model)
- > 3990 - Controllers
- ** Eligible for IBM M/A

Call Chris Bratton
(216) 892-3990
END-USERS ONLY

The BoCoEx index on used computers

Closing prices report for the week ending October 12, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	\$250	\$660	\$200
XT Model 086	\$500	\$550	\$350
XT Model 089	\$550	\$725	\$400
AT Model 099	\$900	\$1,075	\$850
AT Model 239	\$975	\$1,025	\$700
AT Model 339	\$1,025	\$1,300	\$900
PS/2 Model 30-286	\$1,250	\$1,300	\$1,125
PS/2 Model 60	\$1,500	\$1,800	\$1,400
PS/2 Model 70P	\$3,375	\$3,400	\$3,175
Compaq Portable II	\$975	\$1,050	\$875
Portable 286	\$1,275	\$1,450	\$1,100
SLT 286	\$2,600	\$2,625	\$2,000
Portable 386	\$2,700	\$3,000	\$2,500
LTE 286	\$2,000	\$2,100	\$1,850
Deskpro 286	\$1,375	\$1,400	\$1,200
Deskpro 386/20	\$2,900	\$3,100	\$2,400
Apple Macintosh 512	\$375	\$775	\$275
512E	\$450	\$450	\$350
Plus	\$900	\$1,075	\$800
II	\$3,100	\$3,400	\$3,050

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

Buy / Sell / Lease

9370
IN-HOUSE
TECHNICIANS
Buy
Sell
Lease

ssi
simon
systems
inc.

GIGTEX
FINANCIAL
GROUP, INC.

IBM

BUY SELL
LEASE

PS/2 OPERATING
LEASES

3084 3090
PERIPHERALS

OEM/PCM
LEASES

800-888-7568
FAX 214/783-1379

CALL US LAST

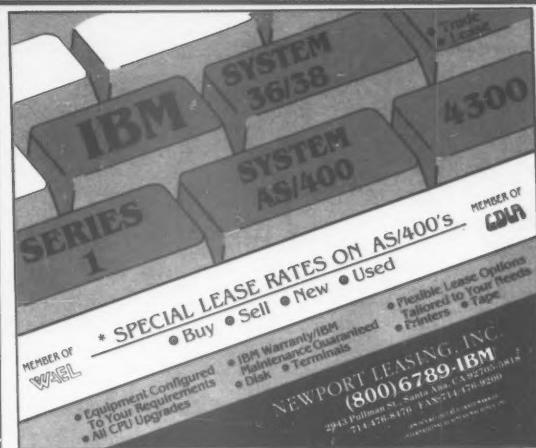
**GET YOUR BEST PRICE
THEN CALL
COMPUTER BROKERS, INC.
WE
Buy - Sell - Lease
New and Used IBM Equipment
AS400 - System 36, 38, 43XX**

SHORT TERM RENTALS

Call 800-238-6405
IN TN 901-372-2622

COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134

'Since 1974'



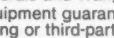
**HEWLETT
PACKARD**
**1000 • 3000
9000**
Computers
Peripherals
Terminals
**Buy • Sell
Rent • Lease**
EURODATA INC
2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

Save 50%
REFURBISHED
WANG

**VS • OIS • PERIPHERALS
PCs AND LASER PRINTERS**

- Disk Drives, Memory Upgrades, Peripherals and Wang-compatibles
- All equipment guaranteed acceptable for Wang or third-party maintenance

In Stock for Immediate Delivery Buy, rent or lease
New Wang PCs* at exceptional savings



□

Authorized Wang PC Dealer 1-800-223-9264
Office Automation Experts Since 1978 *New Wang PCs sold in Wang's Eastern Zone and Southern California only.

PRIME
**EXPERIENCED
 SYSTEMS AND
 PERIPHERALS**
 BUY-SELL-LEASE
 BROKERAGE
 NEW PLUG-COMPATIBLE
 DISK, TAPE, MEMORY
 PLUS
 THE FASTEST I/O
 AVAILABLE ANYWHERE
 1ST SOLUTIONS, INC.
 11460 N CAVIE CREEK RD
 PHOENIX, AZ 85029
 ASK FOR DON SHIFRIS
602-997-0997
 Fax 602-997-1688
 CDIR Computer Data Information Resources

New/Reconditioned
digital
Equipment

Whatever your requirements are for Digital Equipment, call CISI for selling, leasing, trading, leasing, consignment - we do it all!

CISI sells all equipment with a 30 day unconditional guarantee and has the lowest prices and is eligible for DEC maintenance.

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

CISI
Computer Systems, Inc.
83 East Main Street
Easton, MA 02344
Call Toll-Free
1-800-543-5499
In Massachusetts (508) 256-3700
FAX (508) 256-3701

FOR IMMEDIATE SALE			
UNISYS EQUIPMENT			
EQUIPMENT LISTED BELOW DEINSTALLED ON 9-30-90			
STYLE	DESCRIPTION	QTY	
V-380 (CERTIFIED)	10 MEG. CPU	1	
CP3682-1 (CERTIFIED)	DATA COMM PROCESSOR	1	
CP3645-1 (CERTIFIED)	I/O EXPANSION UNIT	1	
T27-12P	CONSOLE SPO	1	
B9246-6	600LPM PRINTER	1	
B9387-42	DISK CONTROLLER	2	
B9410	BASIC SWITCH CABINET	1	
B9410-1	SWITCH RELAY MOD.	2	
B9494-4	400MB-207	3	
B9495-24	MTU 1250/320 KB 200IPS	1	
B9499-21	1X8 GR/PE CONTROLLER	1	
B9485-4	130MB-206	1	
B3837-5	BASIC DISK PACK EXCHANGE	1	
SUBMIT OFFERS TO:		RONALD VALERIAN, 305-NW-7716	
MAILING ADDRESS:		AMERICAN SAL, 17801 NW. 2ND AVENUE MIAMI, FL 33189, ATTN: R.M. VALERIAN	
		FAX# 305-770-2440	

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- Complete Minicomputer Line - New & Used
- All Peripherals & Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices
- HDS-5 and HDS-7 Compatible Terminals

The Recognized Leader in Honeywell Minicomputer Sales and Support

AS/400 S3X
RS/6000
SERIES/1
937X RT 4300

**IBM
4381-R14**
Available
November 5, 1990
IBM 4381-R14
dual processor
32 meg memory
18 channels
Contact:
Foster & Gallagher, Inc.
T. Gibson
(800) 447-0878

9370's
That's All
We Do!

From 20's to 90's
Most Machines,
Peripherals &
Features
IN STOCK
Call us for a quote
708-831-1255
Executive InfOURCE
1530 Eastwood Ave. # 100
Highland Park, IL 60035

HP HP HP HP
NEW and USED
1000 • 3000 • 9000
Including Spectrum
BUY • SELL • TRADE • RENT • LEASE
Processors • Peripherals • Systems
All In Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance

BUY • SELL • LEASE
AS/400
S/38, 36, 34
SERIES 1

■ SYSTEMS
 ■ PERIPHERALS
 ■ UPGRADES

 SOURCE DATA
 PRODUCTS

1976 MacArthur Blvd.
 • 120, Irvine, CA 92715

(714) 851-1970
 (900) 333-2669

VAX RENTALS

MV 3600
MV 3800/3900
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals

- Fast Turnaround • Dependable Products
- Upgrade/Add-On Flexibility
- 6 Months • 12 Months • 24 Months

BROOKVALE ASSOCIATES



Comshare
VMEbus
VMEbus International



DECnet
dda Data Decisions

EST EAST COAST WEST COAST

HONEYWELL
NEW/USED EQUIPMENT

- All Models
- Ultimate Equipment
- Older Equipment Available
- Buy-Sell-Lease-Trade

PARTS & REPAIR
FULLY GUARANTEED
PROMPT DELIVERY
Call: Level 6 Systems
1-216-951-2221
PULL

Prime
Experienced
Systems
New & Used
Peripherals
Worldwide Service
Buy - Sell - Lease
OTW, Inc
305 Union St
Franklin MA 02038
508-520-0250

**COMPUTER
MAGNETIC TAPES**

For Sale

10,000
2400 foot
Certified
Best Offer

Contact
Bill Winkel

609 645-5544

CLASSIFIED

Buy/Sell/Lease

IBM BUY · SELL · LEASE



JENSEY ASSOCIATES

(800) 888-2000

18377 Beach Blvd. Suite 323
Huntington Beach, CA 92648 (714) 847-8486

WANG
Buy-Sell or Trade
VS PC OIS

Systems in Inventory
VS 7000 / 100 / 85 / 65 / 5

And Peripherals
4230A • 4230 • Laser Printers
PC/386sx Workstations

Genesis Equipment Marketing
Phone (602) 948-2720 Fax (602) 948-0615

Data General

- Large inventory of new & used DG equipment available
- Complete systems & spare parts for Nova & MV systems
- Also new Plug-Compatible Disk, Tape & Printers
- World-wide Service
- Buy-Sell-Lease-Rent
- International Computing Systems
- 800-522-ICSC**
- Fax: 612-935-2580

WE BOUGHT

IBM

By the thousands.

As a result of our thousands of purchases of new and used IBM systems of all sizes, shapes and descriptions, we are offering you great savings on IBM AS/400's, 36's, tapes, drives, printers and peripherals, as well as all upgrades.

As a specialty, we offer multiplexors, modems, protocol converters and PS/2's.

If you have a need to buy or sell, call us first and DEAL DIRECT with the...

COMPUTER MARKETPLACE

800-858-1144

In CA, dial (714) 735-2102, 205 East 5th Street, Corona, CA 91719
IBM is a registered trademark of International Business Machines, Inc.

CLASSIFIED MARKETPLACE

Where Computer Professionals Shop

(800) 343-6474

(In MA: 508/879-0700)

BUY · SELL · LEASE · NEW · USED
PERIPHERALS · SYSTEMS · UPDATES

RECONDITIONED COMPUTER EQUIPMENT

VAX 3100...Mod 40
NEW.....\$14,000

IBM Mem Upgrades
NEW/Boxed: \$400 &
Up

VT 420...New...\$480.
VT 220...New...\$410.
VT 220...\$225.

INTEL...82380-20
INTEL...80486-25

APOLLO DN2500
NEW....\$7,500

K0311-BF-11/84 CPU
MSV11-JE-2 MB -
11/84

Call today for quote -

1-800-ICE-BUY'S

INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 585-8888 FAX: (617) 585-8177
• 182 MAIN ST. • KINGSTON, MA 02344

Mini-Computers
& T-Bar Switches
For Sale

Bull DPS6's

Quantities and details
supplied upon request.
No reasonable
offer refused.

Fax # (714) 474-5793
Attn: Bonnie Larson

FOR SALE OR LEASE

- VAX 6210 System
- VAX 6310 Stand-Alone Available

Digital Computer Resale (713) 445-0082

SIZE IS IMPORTANT

Especially when you're outsourcing. You need a company that's big enough to handle everything from data processing to coast-to-coast networking to software development and integration. All with total commitment to customer service and support. And that company is Litton Computer Services. We're just what you're looking for.

- Multiple Data Centers
- Large-scale Information Systems
- Nationwide Network
- Remote Facility Management
- Migration Specialists
- Operating System Conversions
- Integrated Financial Systems
- Major Third-party Software Packages

Litton Call toll free, 1-800-752-6527

Computer Services

REMOTE PROCESSING

PERSONALIZED SERVICE

- Guaranteed Service Levels
- Peak Load Processing
- Satellite Communications
- VM/XA, MVS/XA, DOS/VSE
- Disaster Recovery Services
- Printing & Mail Services
- International Clients
- Committed to Customer Satisfaction

Agway Data Services Inc.
Call 1-800-ADS-7112

"Committed to Customer Satisfaction"

ON-LINE WITH COMPUSOURCE

- Multiple centers
- RACF, CICS, IMS
- Volume & term discounts
- Full technical support
- Disaster recovery services
- MVS/XA, VM, DOS
- SAS, DB2
- Worldwide access
- Laser printing

COMPUSOURCE

(919) 469-3325

HAVE YOUR
QUALITY
CONTROL
MATERIAL
SOURCE
INSPECTED

DONE BY PROFESSIONALS
FROM L.P.C TO AQAP
OR MIL STD'S IN
THE OTTAWA VALLEY
CANADA

International Clients
Phone (613) 729-9031
For Rates

612,000 MIS/DP
Professionals
see the

**CLASSIFIED
MARKETPLACE**

each week.

Call for
advertising information:
(800) 343-6474
(In MA., 508/879-0700)

QUALITY COMPUTING SERVICES

PROCESSING & SYSTEMS OPERATIONS

OUTSOURCING
FACILITIES MANAGEMENT
REMOTE COMPUTING / TIMESHARE

SYSTEMS PLANNING & CONSULTING

STRATEGIC SYSTEMS PLANNING
NEEDS ANALYSIS / FEASIBILITY
QUALITY ASSURANCE PROGRAMS

PROJECT MANAGEMENT

PROJECT LEAD / CONSULTANT SUPPORT
SYSTEMS DEVELOPMENT
SYSTEM / DATA CONVERSIONS

For more information contact Susan Boush at
(206) 924-2527 or (800) 654-9347

Weyerhaeuser
Information Systems

New England

617-595-8000

REMOTE COMPUTING OUTSOURCING

- MVS/XA
- CICS
- DB2
- VM/370
- TSO
- IMS/DBDC
- DOS/VSE
- CMS

OVER 150 SOFTWARE PRODUCTS

- DEVELOPMENT
- PRODUCTIVITY
- DEBUGGING
- PERFORMANCE

- TELENET
- SEARSNET
- TYNMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS INFORMATION SYSTEMS, INC.
815 Commerce Drive, Oak Brook, IL 60521

ICOTECH

MVS/XA
VTAM
TSO/ISPF/SDSF
CICS
ADABAS
LIBRARIAN

DB2
SIMWARE
FILE-AID
INTERTEST
SAS
\$AVRS

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now - Solve Your Computing Worries

TODAY & TOMORROW!
(201) 685-3400

It's the

CLASSIFIED MARKETPLACE

Reach Computer Professionals
Where They Shop For:

- | | |
|---|--|
| <input type="checkbox"/> Buy/Sell/Lease | <input type="checkbox"/> Hardware |
| <input type="checkbox"/> Software | <input type="checkbox"/> Peripherals/Supplies |
| <input type="checkbox"/> Communications | <input type="checkbox"/> Graphics/Desktop Publishing |
| <input type="checkbox"/> Time/Services | <input type="checkbox"/> Bids/Proposals/Real Estate |
| <input type="checkbox"/> Business Opportunities | |

CALL NOW!

(800) 343-6474

(In MA., 508/879-0700).

COMPUTERWORLD

Where all computer buyers and sellers go to market.

Time/Services

Quality Outsourcing

- ♦ IBM Mainframe/Peripherals
- ♦ Full Technical Support
- ♦ 24 hour Help Desk w/ 800#
- ♦ Database Specialists
- ♦ Consulting Services
- ♦ Network Specialists
- ♦ Capacity Planning
- ♦ Automated Operations

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E, ISPF/PDF, SAS, Librarian, IBM IN, PANVALET, EASYTREIVE, Telenet/Tymnet, TOP SECRET



Call: (201) 216-3216

INFORMATION TECHNOLOGY ALLIANCE CORPORATION

ANOTHER REASON WHY COMPUTERWORLD'S MARKETPLACE PAGES WORK ...

Computerworld's Classified Marketplace gives you major decision makers for all types of computer products or services. And for good reason. These buyers purchase many products and services for all ranges of their organization's computers.

Subscribers Involved in Purchasing Computer Equipment and Services in User Organizations

Products	64%
Services	57%
Software	68%
Net Involved	71%

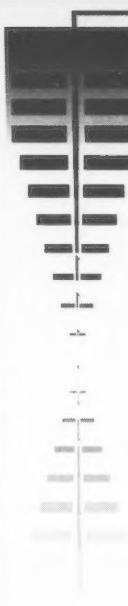
For Computers Other Than PCs

Peripherals	63%
Services	63%
Software	72%
Supplies	54%
Net Involved	76%

To place your ad, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD

Where all computer buyers and sellers go to market.



MCN Computer Services

is your link to perfection.

State-of-the-art IBM compatibility:

MVS-ESA * VM/XA * TSO/E *
ROSCOE * CICS * IMS * IDMS/R *
DB2 * QMF * PROFS *

Programmer productivity aids:

FILE-AID * CICS PLAYBACK *
dBUG-AID * ABEND-AID * CICS
ABEND-AID *

(Preceding products are registered
trademarks of Compuware Corporation)

MCN Computer Services provides outsourcing solutions to major international clients. With one of the country's finest computer facilities, your data is secure, yet readily available. High-quality, cost-effective services include:

- Remote computing
- Computer outsourcing
- Facility management



For more information, call Lisa Walker at:

1-800-521-0444

5225 Auto Club Drive
Dearborn, Michigan 48126



Innovative, Responsive, Quality

a few words that describe
the most complete
computer processor

offering.....

IBM 3090, MVS/XA,
MSA, DB2, VM/HPO,
TSO, CICS/VSAM
and a multitude of
third party software

the complete source for
... outsourcing ...

1-800-443-8797

14300 Sullyfield Circle
Chantilly, Virginia 22021

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IDMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400
- Full Supporting Services
 - Media Conversion
 - Laser & Impact Print Facility
 - Application Programming
 - Technical Support
 - 24 Hours a Day - 7 Days a Week

May & Speh, inc.

1501 Opus Place, Downers Grove, IL 60515-5713

1(800) 729-1501

For More Information Contact: Tony Ranieri

COST-EFFECTIVE COMPUTING SERVICES for TODAY and.... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING COMPUTER OUTSOURCING FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software:
MVS/XA, TSO/E, ISPF/PDF,
CICS, VM/XA, VM/SP, HPO, CMS
- Application Software:
Database Management
Application Development
4/GIs Graphics
Statistical Analysis
- Multiple Communications Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011

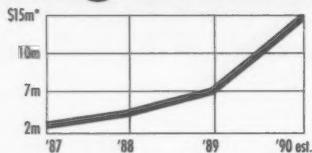


COMDISCO COMPUTING
SERVICES CORP.
430 Gotham Parkway, Carlstadt, NJ 07072

CLASSIFIED

Business Opportunities

You've spent years climbing the ladder. Why not invest in a franchise system that's doing the same?



If you're going to climb the ladder, you might as well climb the ladder of success. Since 1987, computer training revenues for the ExecuTrain® franchise system have grown over 100% a year. And next year, training revenues are expected to grow significantly higher, helping to solidify our position as the leading personal computer training company in the \$44-billion training industry.

If you have a solid business background and can invest at least \$75,000 in a business with a big future, call or write Tom Lang, Director of Franchise Sales, 1-800-843-6984, ext. 204. ExecuTrain, 1000 Abernathy Road, Suite 400, Atlanta, GA 30328.



©1990 Executrain Corporation. This advertisement is not an offering. An offering can only be made by a prospectus filed first with the Department of Law of the State of New York. Such filing does not constitute approval by the Department of Law. Total training revenues throughout the Executrain system, 1990 estimate is based on year-to-date figures through August 1990.

Conversions

CONVERSION EXPERTS

MACRO TO COMMAND

Automatically convert your CICS Macro to CICS Command.

- License Product
- Per Line Service
- Turn-Key Conversion

Conversion products & services on your site or ours. Fixed fee or T&M.



NEOSYNTHETICS, INC.
2860 Des Plaines Ave., Suite 375
Des Plaines, Illinois 60018
708/299-0900 Fax: 299-6044

Automated Conversions to AS/400

from

1. IBM MAINFRAMES. CICS & Batch COBOL. Up to 65% cheaper/75% quicker than manual conversion. Industry proven.
2. NON-IBM. Wang, Unisys, Honeywell, etc.
3. PAPER DOCUMENTS. Imaging Systems on PCs and/or AS/400. Call for details.

CSI Inc.

150 Lafayette Street, Suite 800, NYC, NY 10013
Phone: (212) 431 4084 • Fax: (212) 431 4109

Graphics/Desktop Publishing

PC SCREEN TO BIG SCREEN

Look to BOXLIGHT for the Largest Selection of LCD Pads

TRUE COLOR SYSTEMS from \$4995
MONOCHROME SYSTEMS from \$599

BOXLIGHT CORPORATION
206/697-4008

Computer-Based Presentation Systems Since 1984

COMPUTERWORLD CLASSIFIED MARKETPLACE

Examines the issues while computer professionals examine your message. Call for all the details.

(800)343-6474
(In MA., 508/679-0700)

Software

KeyEntry III

PC-BASED DATA INPUT SOFTWARE
REPLACE DEDICATED DATA ENTRY SYSTEMS
FRONT-END MAINFRAME APPLICATIONS

- ❑ LAN or stand-alone environments
- ❑ Two-pass verification
- ❑ Batch balancing and check digits
- ❑ Operator statistics reporting
- ❑ Enhanced numeric keypad emulation
- ❑ Extensive field edits and table lookups
- ❑ Screen Painter and MenuManager included

FREE evaluation systems available for qualified companies.

1-800-533-6879

 SOUTHERN COMPUTER SYSTEMS, INC.
2732 Seventh Avenue South • Birmingham, AL 35233
PHONE (205)531-2895 • FAX (205)532-4811

Peripherals/Supplies

9-Track Tape For Your IBM PC/XT/AT/PS-2™



Read 1600 or 6250 bpi
9-track tapes from a 3-track, multi-track or EBCDIC
or ASCII as mirror image or
by individual files.

Use the 2000 PC™ for
disk backup, data inter-
change or archival storage.
PC/XT/AT/PS-2 are trademarks of IBM.

It's the

Classified Marketplace

Reach Computer
Professionals
Where They
Shop For:

- Buy/Sell/Lease
- Hardware
- Software
- Peripherals/Supplies
- Communications
- Graphics/Desktop Publishing
- Time/Services
- Bids/Proposals/Real Estate
- Business Opportunity

CALL NOW

800 343-6474
(In MA., 508/679-0700)

Advertise Your Products In The

Classified Marketplace

Featuring

- | | |
|--|---|
| <input type="checkbox"/> Hardware | <input type="checkbox"/> Software |
| <input type="checkbox"/> PC Products | <input type="checkbox"/> Conversions |
| <input type="checkbox"/> Time/Services | <input type="checkbox"/> Buy/Sell/Lease |
| <input type="checkbox"/> Communications | <input type="checkbox"/> Peripherals/Supplies |
| <input type="checkbox"/> Business Opportunities | <input type="checkbox"/> Bids/Proposals/Real Estate |
| <input type="checkbox"/> Graphics/Desktop Publishing | |

Reach over 612,000 information systems professionals by placing your company's message in

Classified Marketplace.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____

State: _____ Zip: _____

Telephone: _____

Ad Size:

_____ columns wide x _____ inches deep.

I am enclosing ad material with this form.

Return this form and advertising material to:

COMPUTERWORLD

Classified Marketplace

375 Cochituate Road, Box 9171
Framingham, MA 01701-9171

(800) 343-6474

(In MA., (508) 879-0700)



COMPUTERWORLD

Where all computer buyers and sellers go to market.

TRAINING

Stimulating students

Technology-delivered instruction can spice up training sessions

BY JESSICA KEYES
SPECIAL TO CW

How many of you remember sitting in a classroom and watching one of those boring filmstrips? The lights are dim, the fan from the projector is hypnotically whirring, and a voice, somewhere in the darkness, is speaking in a very soothing monotone. Just about the only thing keeping you awake is the piercing beep between each slide frame.

As a former schoolteacher, I've learned to keep teaching interesting and interactive. From performing magic tricks for the class to having the class construct towers made of Lego blocks, the method to this madness is stimulation. But lack of stimulation seems to be the problem with most technology-delivered instruction (TDI) programs today.

TDI, an acronym coined recently by the computer training industry, encompasses computer-based training (CBT), video, interactive video, multimedia and

more. In trying to understand the role of TDI in corporate training, the National Training and Computer Project (NTCP) in Raquette Lake, N.Y., conducted a survey of 250 computer training managers. The survey unearthed the following:

- Some 97% of those surveyed were using TDI.
- The most popular form of TDI is video; the second most popular is CBT.
- 100% of the respondents were interested in interactive video, but only 13% had actually implemented an interactive video training program.
- Instructor-led training continues to be the No. 1 mode of instruction, with TDI coming in second place. Most managers surveyed indicated that they plan to move in the TDI direction in the next year or two.
- Even though management viewed TDI as cost-effective, the survey showed that there was some resistance to using it.

The last finding is probably the most revealing. If TDI is gaining in popularity, why the resistance? For the most part, training department forays into TDI have been at the low end — video, audio or CBT. While this path is certainly the cheapest, it is also the least interesting for the user.

Time and time again it's been proven that a rich learning environment will stimulate the learner to absorb more and retain this new information longer. Thus,



information systems managers and trainers should look at each of the instructional methods and decide which would be the most effective.

Video training. These programs are usually characterized by what is known as "talking heads" and floating text on the video screen. The video camera pans in on the face of the lecturer (the talking head) half of the time, and the video screen is filled with a large image of a computer screen with text-based examples floating by the rest of the time. This sort of training is not sufficient for intensive instructional sessions. On the other hand, it's great for general "getting started" tutorials and refresher courses.

Interactive video. Interactive videos are definitely one step up from training videos. The student views a segment of the video and is then asked to respond to certain questions. Depending on his responses, the student jumps to a different segment of the video. Basically, this is self-paced instruction — but it still uses "talking heads."

CBT. This form of TDI is currently experiencing the largest growth, spurred by the increasing number of personal computer-based training products. If you go to a computer store, you'll find at least a dozen CBT products that can teach everything from word processing, the C programming language and typing. Here, the student interacts directly with the computer. But as interactive as it is, it's still text-based.

Expert systems. Expert systems have joined the fold of TDI. Increasingly, expert instructional systems are being

built with the purpose of providing much more than just standard instruction. The goal is to provide an automated expert so that the student is learning from a recognized master. At IBM's Sterling Forest, N.Y., facility, an expert system is being developed that can teach security guards how to fix broken security doors. The system can instruct guards in all facets of this technical task in a step-by-step manner.

Multimedia. The biggest bang for the TDI buck will come from multimedia. Multimedia is the latest buzzword on the horizon. It is about as high-tech as it gets, with a combination of video, audio, text and graphics that produce one integrated system. What this entails is all forms of TDI combined into one visually glorious and stimulating system.

Instructor-led training. The NTCP survey reveals that instructor-led training is the most popular method of teaching outside of the TDI realm. Therefore, why not take advantage of its acceptance through videoconferencing? If a company has a large number of employees to train, the norm has always been to offer the course many times to accommodate the large registration. While start-up costs for videoconferencing are high, in the long run, it is actually less expensive than paying for airfare and hotels when course locations are widely distributed.

High-tech training systems can help IS managers and trainers invigorate the learning process and put some pizzazz into corporate technical training. However, they must use the best method for each circumstance, or the trainees will lose interest — fast.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

What training issues would you like to see covered? Call Cathy Duffy, associate editor at *Computerworld*, at (800) 343-6474 or fax at (508) 875-8931.

COMPUTERWORLD October/November Training Editorial Topics

29 The PC superstores are coming.

Executive Report:

Advancing the Business Cause - Gaining an Edge in Pricing

Ad Close: Oct 23

5 How to Evaluate Training Product Spotlight:

Imaging

Ad Close: Oct 30

12 Uniting Training with Documentation

Product Spotlight:

PCs and Workstations

Show Distribution:

Comdex Fall, Las Vegas

Ad Close: Nov 6

Instructor-Led Mainframe Training and Development for IBM and related products.

Interact
INFORMATION SERVICES, INC.

914-332-6100
(Within NYS)

800-628-5471
(Outside NYS)

IBM® INSTRUCTOR-LED MAINFRAME TRAINING AT YOUR SITE

CALL 800-252-6696
FOR OUR CATALOG OF OVER 80 COURSES

"C"

ASM

COBOL

CICS VSAM

DB2 SQL ORACLE

APPLICATION SYSTEM

DATA COMMUNICATIONS

THE KNOWLEDGE EXCHANGE, INC.

WE'RE NOT BERLITZ

BUT WE SPEAK ALL LANGUAGES

*IBM is a registered trademark of the International Business Machines Corporation

COMPUTERWORLD
Training Pages
give you
cost-effective
reach!

That's because *Computerworld's* training pages give you the most widespread reach available to management and staff in America's 18 departments — the departments that directly control America's IS training dollars.

And for good reason *Computerworld's* training pages are the most widely used in America's IS departments — the departments that directly control nearly 80% of the \$23 billion spent annually on training of computer software, hardware, data communications equipment, services and staff.

What's more *Computerworld's* Training Pages lead buyers to your ad with a weekly Training editorial feature that anchors the section. Training Pages cover topics like "Unraveling SQL for MIS pros," or "Finishing the training contract." *Computerworld's* Training Pages offer pertinent, advice-oriented editorial to *Computerworld's* readers every week.

Tips & Techniques Developers Handbook NATURAL 2

NATURAL 2 Study Guide

Inside ADABAS Study Guide

Introduction to PREDICT

Introduction to SUPER NATURAL

XWords™ Cross Referencing Pkg

WH & O International

P O Box 82-335

Wellesley, MA 02181

Tel: (617) 239-0822

FAX: (617) 239-0827

PROMOTING A BETTER UNDERSTANDING OF INFORMATION ENGINEERING

CEC is pleased to present the current public offerings of our Information Engineering courses.

Course	Date	Location	Price/ Student
IE/Planning	Nov. 5-7	Los Angeles	\$895.00
IE/Analysis	Nov. 12-14	Los Angeles	\$895.00
IE/Design	Oct. 22-25	Detroit	\$1195.00
	Dec. 3-6	Los Angeles	\$1195.00

For more information about our offerings, please contact the CEC Education Coordinator at:

(313) 569-0900

ceo

"The IE Practitioners"

18620 W. 10 Mile Rd. • Southfield, MI 48075-2667



COMPUTERWORLD

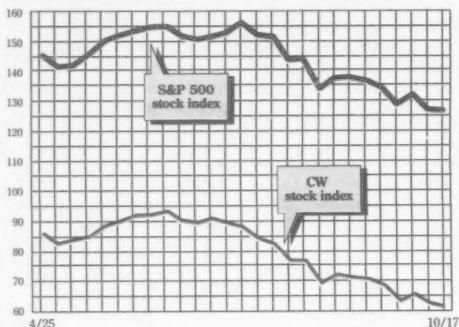
TRAINING SECTION

Examines the issues while Computer Professionals examine your message. Call for all the details

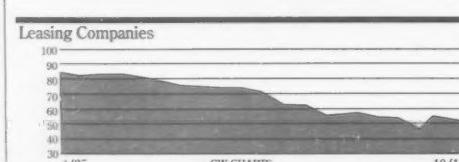
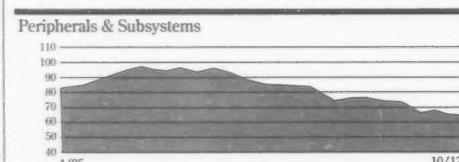
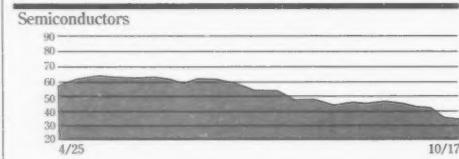
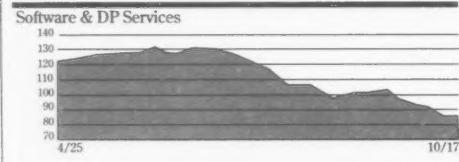
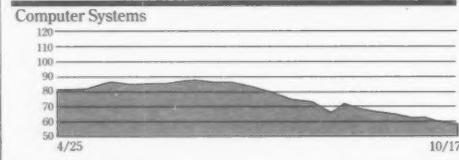
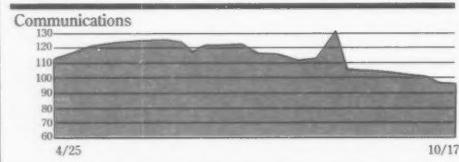
(800) 343-6474

(in MA, 508/879-0700)

STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	96.9	95.1
Computer Systems	60.1	59.8
Software & DP Services	86.3	86.6
Semiconductors	36.3	35.5
Peripherals & Subsystems	67.3	65.6
Leasing Companies	53.6	50.4
Composite Index	61.8	60.5
S&P 500 Index	126.9	126.2



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCT. 17, 1990

E X C H	PRICE	52-WEEK RANGE	CLOSE OCT. 17, 1990	WEEK NET CHANGE	WEEK PCT CHNGE
N AMERICAN INFO TECHS CORP	68	53	63.5	1.6	2.6
Q ANDREW CORP	26	16	16.5	0.0	0.0
A ARTEL COMM CORP	10	2	2	-0.4	-15.8
N BELL ATLANTIC CORP	47	30	30.85	-0.25	-0.8
Q AVANTEK INC	5	2	1.888	-0.1	-5.5
N AYDIN CORP	20	10	10.5	-1.0	-8.7
N BELL SYSTEM CORP	59	49	49.25	2.8	5.9
N COMPRESSION LABS INC	16	7	12.125	-2.4	-16.4
N CONTEL CORP	36	23	32.875	1.1	3.5
N DATA SWITCH CORP	4	2	2.875	0.0	0.0
N DIGITAL COMM ASSOC	27	9	9.25	-0.2	-2.1
N DYNACOM CORP	19	12	12.25	-0.4	-3.0
N FIBRONICS INTL INC	13	5	6.5	0.5	8.3
N GANDALF TECHNOLOGIES	6	2	2.375	0.0	0.0
N GENITAL DATA COMMUNICS	36	2	2.125	1.0	38.0
N INT'L CORP	10	2	2	-0.3	-11.1
N INFOTRON SYCS CORP	61	40	41.125	-1.3	-3.2
N ITT CORP	7	3	4.125	-0.1	-2.9
N MC COMMUNICATIONS CORP	49	29	29.25	-2.9	-8.8
N NETWORK EQUIP TECH INC	34	15	5.875	-0.6	-9.6
N NETWORK SYS CORP	30	21	22.75	0.1	0.4
N NORTHERN TELECOM LTD	29	21	21.75	-0.8	-3.2
N NYNEX CORP	92	68	71.125	-3.0	-4.0
N PACIFIC TELEISYS GROUP	26	16	14.4	1.6	3.8
A PENNRL CORP	9	5	4.75	-0.1	-2.6
N SOUTHWESTERN ATLANTA INC	29	12	14.5	2.0	15.7
N SOUTHWESTERN BELL CORP	65	47	53.625	-1.9	-3.6
Q 3 COM CORP	19	6	6.625	-0.8	-10.2
N U.S. WEST INC	41	32	36	1.0	2.9

Peripherals

Communications and Network Services

E X C H	PRICE	52-WEEK RANGE	CLOSE OCT. 17, 1990	WEEK NET CHANGE	WEEK PCT CHNGE
O ALLOY COMP	2	0	0.375	0.1	-2.5
N AM INT'L INC	6	1	1.25	-0.1	-8.1
Q AUTO TROL TECH CORP	4	2	2	-0.3	-11.1
Q BANCITS INC	24	13	13.25	0.0	0.0
Q BANCITS INC	8	3	6	0.0	0.0
Q CONNER PERIPHERALS	31	11	17.125	1.5	9.6
Q DATARAM CORP	22	8	9.125	-0.4	-4.3
N EASTMAN FOAK CO	45	34	37.125	2.1	5.1
N EASTMAN FOAK CO	7	6	6	0.4	6.7
Q EMULEX CORP	9	4	5.125	-0.5	-9.9
N EVANS & SUTHERLAND	35	18	18.25	-2.8	-13.1
N FLEET LEAF INC	2	0	0.375	0.5	-34.4
N ICOMEGA CORP	6	3	4.188	-0.2	-4.3
Q IOMEGA CORP	3	1	0.563	-0.1	-18.2
N MAXTOR SYS CORP	17	4	5.125	0.4	7.9
N MAXTOR SYS CORP	1	0	0.25	0.0	-12.5
N MINNESOTA MNG & MFG CO	91	71	75.125	-0.8	-1.0
N PERSONAL COMP PRODUCTS INC	5	4	3.688	-0.1	-1.7
N QMCDTRONIX INC	16	6	6.375	3.6	-36.3
N QMDS INC	21	9	10.125	0.0	0.0
N QUANTUM CORP	26	9	14.5	0.3	1.8
N RECOGNITION EQUIP INC	8	4	5	0.0	0.0
N SEAGATE TECHNOLOGY	20	6	6.125	0.0	0.0
N STORAGE TECH CORP	35	11	13.5	1.6	13.7
N TANDON CORP	4	1	1.688	0.1	3.9
N TECNOSYS INC	19	12	11.25	1.1	11.2
N VIDEO SYS INC	1	0	0.25	0.0	-1.2
N XEROX CORP	63	30	30.75	-2.5	-7.5

Leasing Companies

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

High notes

Tech stocks sing happy tunes after weeks of playing the blues

Many technology firms were singing good news last week, and positive earnings reports were beautiful music to the ears of stock market investors. Software maker Adobe Systems, Inc. warbled the loudest, belting out a 5½-point gain to close Thursday at 24½; a great cast of other tech stocks also turned in star performances.

Hardware giant Digital Equipment Corp. announced quarterly earnings to the tune of 21 cents per share, higher than many analysts' expectations. DEC stock soared to 51 Thursday, up 4½ points for the week. Rival IBM rang out with an increase of 5½ points to 105%, and Compaq Computer Corp., proclaiming a new Intel Corp. 80386-based laptop personal computer and price slashes on desktop models, roared a powerful 5½-point gain to reach 42.

Cray Research, Inc., after an abysmal recent performance, regained its composure last week and scaled up to 24½ — a climb of 2½ points. NCR Corp., however, screeched out a sour note among systems companies. Reporting a decline in domestic orders, NCR sank 3½ points for the week, closing at 46%.

Microsoft Corp., declaring big earnings gains, chimed in with Adobe in leading the software surge. Microsoft jumped 4½ points to 61%. Despite a 46-cent-per-share loss in earnings for Samna Corp., its stock hopped up to finish at 11½, up 2½ points. Lotus Development Corp. settled its legal squabbles with Paperback Software International, Inc. and crooned a ¾-point gain to close at 15.

Among semiconductor firms, Intel scored consistent gains to add 4 points for the week, despite a minor setback in its dispute with Advanced Micro Devices, Inc. (AMD). Intel recorded a closing value of 34 points. AMD, meanwhile, dropped ½ of a notch to 3%. Motorola, Inc. jumped 1½ points to 55%.

MCI Communications Corp., absorbing network upgrading costs in its quarterly statement, plummeted 2½ points to 27%.

DEREK SLATER

Computer Systems

E X C H	PRICE	52-WEEK RANGE	CLOSE OCT. 17, 1990	WEEK NET CHANGE	WEEK PCT CHNGE
Q ALLIANT COMPUTER SYS	9	1	1.5	0.0	0.0
Q ALPHAMAIN SYSTEMS	5	1	0.825	0.0	0.0
Q ALTHORN COMPUTER	8	5	11.15	0.4	3.4
Q AMDHAL CORP	19	10	11.5	0.3	2.7
Q APPLE COMPUTER INC	50	24	26.5	0.0	0.0
Q ASTRESH INC	26	8	16.5	-0.4	-4.3
Q BELL & HOWELL & NEWMAN	8	4	4.025	0.3	5.1
N COMPO COMPUTER CORP	68	36	38.75	0.0	0.0
N COMPUTER AUTOMATION INC	12	5	5.875	-0.2	-6.0
N CONTROL SYSTEM INC	6	0	0.813	-0.2	-18.7
N CRAY RESEARCH INC	51	20	23.5	1.5	6.8
N DATA GEN CORP	15	4	4.625	-0.3	-5.1
N DATAPoint CORP	5	1	1.375	0.3	22.2
Q DEC COMPUTER CORP	14	5	1.5	1.1	13.0
N DELL COMPUTER CORP	95	46	46.75	-0.3	-0.5
N FLOATING POINT SYS INC	4	0	1.375	0.3	15.4
N HARRIS CORP	38	15	15.375	-1.9	-10.9
N HONEYWELL INC	112	71	75.75	0.9	1.2
N IBM	123	93	100.75	-2.8	-2.7
N INFORMATION INTL INC	14	5	8.25	0.9	11.4
N IPLEX INC	14	5	3.025	0.0	0.0
N MAI BASIC FOUR INC	5	1	1.25	-0.3	-16.7
N MATSUSHITA ELEC IND LTD	167	116	148	9.9	7.1
N MENTOR GRAPHICS CORP	26	9	10.125	0.1	1.3
N MICROSOFT CORP	72	46	45.25	-8.0	-16.1
N NCR CORP	60	32	35.75	3.3	10.0
N PYRAMID TECHNOLOGY	36	14	16	0.8	4.9
N SEQUENT COMP SYS INC	34	13	18	2.3	14.3
N SUNDISK SYSTEM INC	37	15	9.125	3.8	51.1
N TAMBROUSZ CORP	2	0	0.313	0.0	0.0
N TANDEM COMPUTERS INC	30	10	10.875	1.3	13.0
N TANDY CORP	46	24	25.125	-0.3	-1.0
N ULTIMATE CORP	10	3	3.25	0.0	0.0
N UNISYS CORP	19	3	3.75	-0.3	-8.3
N WANG LABS INC	6	3	2.875	-0.3	-8.0

Software & DP Services

E X C H	PRICE	52-WEEK RANGE	CLOSE OCT. 17, 1990	WEEK NET CHANGE	WEEK PCT CHNGE
Q AMERICAN MGMT SYS INC	20	11	14	0.0	0.0
Q AMERICAN SOFTWARE INC	18	8	8.375	0.8	9.8
Q ANACOMP INC	5	1	1.375	-0.4	-21.4
Q ARTEL COMM CORP	20	11	11.5	1.9	19.5
Q ASHTON TATE	15	6	5.875	0.5	7.8
Q ASK COMPUTER SYS INC	10	4	5.25	0.6	13.5
N AUTO DATA PROCESSING	60	44	48.875	1.9	4.0
N AUTONET INC	39	16	19.25	3.3	18.6
N BUSINESSLAND INC	12	1	2	0.1	6.7
N COGNOS INC	10	4	5.5	-0.4	-6.4
N COMPUTER ASSOC INTL INC	17	9	5.625	0.4	7.1
N COMPUTER HORZONS CORP	17	8	11.5	2.1	22.2
N COMPUTER SCIENCES CORP	59	37	38.25	-2.3	-5.6
N COMPUTER TASK GROUP INC	12	8	8.125	0.5	5.8
N COMSHARE INC	25	14	15.5	-0.5	-3.1
N COMPUTERWARE INC	38	24	32.75	0.5	1.6
N GENERAL MTRS (CLSE)	18	10	9.75	0.3	3.2
N GOAL SYSTEMS INTL	7	2	2.5	-0.1	-4.8
N HOGAN SYS INC	19	12	5.375	0.9	19.4
N INTELLIGROUP INC	8	2	2	-0.6	-23.8
N LEGENT CORP	31	17	17.25	0.0	0.0
N LOTUS DEV CORP	39	13	14.5	-1.3	-7.9
N MCGRAW HILL CORP	80	38	56.5	-3.0	-5.0
N NATIONAL DATA CORP	33	8	8.75	-0.3	-3.8
N ONLINE SOFTWARE INTL INC	11	5	4.625	-0.4	-7.5
N ORACLE SYS CORP	188	54	61.25	0.1	2.1
N PAPERBACK SOFTWARE INC	17	12	15.375	-0.4	-2.4
N PHOENIX TECHNOLOGIES INC	28	14	16.75	1.0	6.3
N POLICY MGMT SYS CORP	43	30	34	-1.5	-4.2
N PROGRAMMING & SYS INC	25	12	13.75	0.8	5.8
N RELATIONAL TECH INC	10	3	6.825	0.1	1.5
N RENDEZ VOUS INC	16	8	6.925	-0.3	-2.5
N SAGE SOFTWARE INC	22	15	15.25	0.3	1.7
N SEI CORP	17	12	15.375	-0.4	-2.4
N SHARED MED SYS CORP	12	8	6.75	0.8	12.5
N SONY COMPUTER POWER INC	28	14	16.75	1.0	6.3
N STERLING SOFTWARE INC	26	15	15	0.0	0.0
N SUNGARD DATA SYS INC	25	6	8.5	0.0	0.0
N SYSTEM CENTER INC	29	13	16.75	2.9	20.7
N SYS. SOFT INC	2	1	0.813	-0.2	-18.7
N WESTERN DIGITAL CORP	15	5	5.25	0.0	0.0

Semiconductors

E X C H	PRICE	52-WEEK RANGE	CLOSE OCT. 17, 1990	WEEK NET CHANGE	WEEK PCT CHNGE
N ADV MICRO DEVICES INC	11	4	3.75	0.1	3.2
N ANALOG DEVICES INC	10	6	5.75	-0.3	-5.0
N ANALOGIC CORP	11	8	8.25	0.0	0.0
N CHIPS & TECHNOLOGIES INC	25	6	6	-1.3	-17.2
N INTEGRATED SYSTEMS INC	22	12	12.25	2.0	18.6
N MICRON TECHNOLOGY INC	16	7	7.375	-0.1	-1.7
N MOTOROLA INC	88	52	54	1.0	1.9
N NATL SEMICONDUCTOR	9	3	3.125	-0.3	-7.4
N TEXAS INSTRNS INC	44	23	24.37		

NEWS SHORTS

DG contract probed

Data General Corp. has encountered another stumbling block on its way to deliver Avion Unix-based workstations to the U.S. Geological Survey. A much-needed \$127 million contract was restored to DG recently by the U.S. Circuit Court of Appeals for the District of Columbia. The contract, for 6,000 Avion workstations, was initially won by DG last December and suspended in March after losing bidders complained. The latest controversy involves the U.S. Department of the Interior's investigation into events surrounding a U.S. congressman's charge that aspects of the bid process were unfair. In other news last week, DG signed a five-year OEM agreement, worth as much as \$45 million, with Sprint International, a division of U.S. Sprint Communications Co. Under the agreement, Avion servers and workstations will be sold as enhanced components of Sprint International's private network and messaging system offerings.

Bell Atlantic tries wireless networks

Bell Atlantic Corp. plans to start testing a telecommunications technology that could potentially allow the regional operating companies to set up wireless communications networks without having to pressure the Federal Communications Commission to reallocate radio frequency bandwidth already in use. The equipment, supplied by Omnipoint Data Co., will use spread-spectrum communications, which reportedly do not interfere with other transmissions on the same radio frequency bandwidth. Bell Atlantic said it will be testing other types of wireless communications during the next 12 months.

NCR details networking strategy

As expected, NCR Corp. delivered its open systems-based networking architecture last week. The NCR Open Networking Environment is composed of four elements: an Open Systems Interconnect (OSI) backbone network, the NCR Open Network System (ONS), featuring application services such as X.400 message handling; AT&T Unix System V Release 4 interfaces for de facto industry communications standards such as IBM's Systems Network Architecture; protocol conversion products for moving from old network environments to OSI networking; and an OSI network management tool. ONS will be sold either as a stand-alone software system or as an add-on component to NCR's recently announced System 3000 line.

Phony MS-DOS sweep

A police raid on a trading company in Taipei, Taiwan, last week cracked a sophisticated software counterfeiting ring that had allegedly distributed more than 30,000 copies of Microsoft Corp.'s MS-DOS operating system across Taiwan, North America and Europe. The search of Data State Corp. yielded 5,500 complete counterfeit copies of MS-DOS Versions 3.3 and 4.01, according to Microsoft.

Sun shifts to AT&T Unix

In a step toward moving Sun Microsystems, Inc.'s hardware to the Unix International standard (based on AT&T's Unix System V) Sun announced a developers' platform last week. Sun's current Unix version is based on the University of California at Berkeley's Unix standards. Users' applications will be able to run on the new operating system without recompiling, according to Sun. A user version of the operating system is slated for 1992.

Cray wins deal in Japan

Tohoku University in Miyagi-ken, Japan, has leased a supercomputer from Cray Research, Inc. in Minneapolis. A Cray Y-MP8 system will be installed at the university's Institute of Fluid Science before the end of this year. The computer and peripheral equipment is the first Cray Research system to be installed at a Japanese public university. Cray also announced last week that the NASA Langley Research Center in Hampton, Va., has ordered a second Cray Y-MP8. The used system is scheduled for installation at Langley in the fourth quarter.

U.S. warned on security standard

BY MICHAEL ALEXANDER
CW STAFF

A computer security advisory group will warn U.S. Department of Commerce Secretary Robert Mosbacher this week that a proposed European computer security standard would jeopardize the ability of U.S. vendors to do business abroad.

In a letter that is expected to reach Mosbacher's desk this week, the 12-member panel said that recent efforts by four European nations to push for a single computer standard pose risks for the U.S. computer industry because computer makers would be forced to develop two versions of the same software.

The U.S. already has a security standard for classified, military-related computer systems developed by the National Security Agency (NSA) and detailed in the so-called "orange book."

The Computer Security Act of 1987 mandated that the National Institute of Standards and Technology (NIST) develop guidelines to improve the privacy of sensitive information in federal computer systems. Those standards could be based on the proposed international standard, NIST officials said.

The advisory board was established under the 1987 security act to advise the NSA and NIST on computer security and privacy issues. "The acceptance of European standards would

certainly cause mischief, especially to the IBMs and DECs of the world," which derive more than half of their revenue overseas, said Willis Ware, chairman of the advisory board. Ware, a noted computer security expert, is a member of the corporate research board at Rand Corp.

In September, Germany, France, the Netherlands and the UK asked for international comments regarding a proposed plan that is referred to as the international technology security evaluation criteria.

"Whether those four have enough unanimity or clout to bring along the rest of Europe remains to be seen," Ware said. "In 1992, when they have the United States of Europe, they are going to start acting like a cohesive group of states. They are serious about stacking the deck in favor of the indigenous computer industry."

The proposed European standards are based on the orange book criteria for classified, defense-related systems. However, the European plan would set security guidelines for military and civilian commercial systems.

"While it may claim to be in the spirit of the orange book, it is fundamentally different" in that it also aims to cover civilian systems, said Lynn McNulty, associate director for computer secu-

rity at NIST's National Computer Systems Laboratory.

Also, "there is no consensus within the government whether the orange book is ready to be taken into the international arena," McNulty said. The orange book, which is intended for classified computer systems users,

will need to be retooled to fit the diverse needs of civilian computer systems users, he said.

NIST has come under considerable criticism in recent months for failing to develop computer security standards as outlined under the 1987 security act.

In a speech delivered earlier this month at the 13th National Computer Security Conference in Washington, D.C., Rep. Robert G. Torrocello (D-N.J.), chairman of a U.S. House of Representatives subcommittee on transportation, aviation and materials, blasted NIST for its inactivity and for failing to take a leadership role in developing a civilian orange book that could be implemented here and perhaps abroad.

One NIST official, who asked not to be identified, conceded that the computer laboratory has made little progress in implementing the mandates of the security act but said that it lacked the funds to proceed as required by law.

Crime

FROM PAGE 1

Army's Criminal Investigations Command and the Navy's Investigative Services Command receive little training in computer technology, spokesmen for both agencies said. The few agents who can be considered experts do not solely investigate computer-related crimes and are often required to assist in investigations that occur within territories that span continents.

None of the defense branches specifically track the number of computer-related crimes their agents handle, but they say that the crimes are on the rise.

"The potential for crime is increasing by virtue of the increase in the number of computers in every aspect of our daily lives," said Col. Patrick Letellier, deputy commander of operations at the AFOSI.

Each year, the AFOSI's computer crime agents investigate allegations involving millions of dollars, said Maj. Stephen Headley, director of public affairs.

"People thought computer crime was synonymous with fraud," said Jim Christy, chief of the AFOSI's Computer Crime

Division. "We're finding in the three OSI disciplines — general crimes, economic crimes and counterintelligence crimes — that computer crime and computer evidence is in all three of those disciplines."

Software piracy is so widespread, "I am not sure that we can handle it," Christy said. One investigation revealed that 35% of computer users had unauthorized files containing games, letters and resumes that took up 12% of the hard-disk storage space. Two people were also found to be operating part-time businesses.

On the rise

Attempts by hackers from within and outside of the U.S. to break into Air Force and other military computer systems are also increasing, Christy said. Hackers' attacks on military systems "were not a major problem until recently," Christy said.

"There weren't that many of what we call world-class hackers. What has happened now is that they're organizing, writing manuals telling the not-so-bright hacker how to break into a system. A 10- or 12-year-old can read and follow directions step-by-step and break into a govern-

ment computer."

In August, the AFOSI helped nab a 14-year-old boy who is accused of breaking into a superminicomputer at the Pentagon and downloading unclassified documents belonging to the Air Force. Although the pilfered files were innocuous, authorities were alarmed because previous intrusions by hackers have shown that such information collected over a period of time could be revealing, Headley said.

Also in August, an airman pleaded guilty to possession of at least 15 access codes with intent to defraud in a U.S. District Court in Pensacola, Fla. The airman was alleged to be a member of the Legion of Doom, a hacker group currently under investigation.

Foreign intelligence agents also routinely target computer systems, according to some analysts. Again, the problem is not being actively combated by the military's computer experts. If an intrusion is detected, Navy investigators seek help from the users whose systems have been attacked or the Federal Bureau of Investigation, said Ernest Simon, deputy director of the fraud division of the Navy's Investigative Services Command.

IBM brims with Q3 confidence

Observers question slack sales, comparison to poor '89 third quarter

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — IBM last week reported a banner 1990 third quarter, but analysts and investors spotted a few red flags.

On its face, the report for the quarter ended Sept. 30 was upbeat. IBM logged a 27% net income increase to \$1.11 billion on revenue that was up 6.8% to \$15.3 billion. In addition, the company showed an after-tax margin of 7.3%, compared with 6.1% in last year's third quarter.

In a prepared statement, Chairman John Akers credited the healthy numbers to the company's ongoing restructuring and extensive product portfolio — the strongest in IBM history, he said. "Assuming no further deterioration in the world's economies," Akers added, "we continue to expect substantially improved financial performance for 1990."

Eye-catching

Nevertheless, three points caught analysts' eyes. Hardware sales were down 1.5% year-over-year — a dip that resulted from a planned high-end product transition to the Enterprise System/9000 family, IBM told analysts during a teleconference.

Peter Labe, an analyst at Labe, Simpson & Co., said the sales line was further weighted down by weak personal computer-generated revenue in the

July-August time frame; PC sales rebounded in September, but not enough to counteract the summer sag.

IBM's omission of all reference to currency was disconcerting to several analysts. The weakness of the dollar over the past quarter, analysts said, provided a currency translation benefit to U.S.-based companies. Labe said an IBM financial executive refused to comment on any benefit from currency translations.

The glow on the quarterly report was also dimmed by the recognition that it was being compared with a poor 1989 third quarter, according to analysts.

During that 1989 period, IBM was hard hit by disk drive delays. That last week's figures show by comparison, several of them said, relays more bad about last year's fall quarter than good about this year's.

On balance, however, analysts agreed that the third quarter was a solid one, if not the rave it initially appeared to be.

"Other than [hardware] sales, everything in this report is as I expected, or better," said Sanjiv Hirshorn, an analyst at Salomon Brothers. Granted, "if you exclude currency," he said, "revenues would be lower — but that is one of the advantages of being a truly global player: Your markets can balance each other out, instead of leaving you vulnerable to one country's currency."

At Manufacturers National Bank in Livonia, Mich., First Vice-President of Information Systems Donald Vaughan echoed the sentiment.

"With a company the size of IBM, I'm not sure that it's meaningful to scrutinize everything on a quarterly basis," he added. "If they consistently had disastrous quarters, then we might

Happier days

IBM's third-quarter profits edged up, recovering from last year's earnings dip

Third quarter	1988	1989	1990
Revenue	\$13.7	\$14.3	\$15.3
Earnings	\$1.2	\$0.88	\$1.11

(in billions of dollars)

Source: IBM

CW Chart: Marie Haines

get concerned."

Vaughan said he found Akers' bow to macroeconomic shifts a realistic observation rather than a dire portent. "If the whole world economy is in trouble, we're probably not going to run out and buy a new 3090," he said.

On the other hand, he added, even with economists widely acknowledging that the U.S. is nearing a recession, if it is not in one, and with several worldwide economies on shaky ground, the bank's IBM expansion plans are proceeding apace.

the goal is to eventually make the two data models consistent but did not specify when.

Although IBM has a single grand plan for its strategic architectures, they are being developed by different teams on different schedules. As is the case with the data models, one group can sometimes get ahead of another, said John Sweitzer, a Systemview data model architect and Al Nisbet, a manager of AD/Cycle tools and services.

Systemview development began a few months ahead of AD/Cycle, the IBM executives said, and both models were originally based on an entity relationship concept, according to Sweitzer. However, Systemview developers changed directions this year and adopted object-oriented principles as outlined by the International Standards Organization's Guidelines for Definition of Managed Objects. Meanwhile, the AD/Cycle group had already committed to a release date of its model and had no choice but to proceed with its product.

"There are efforts now to look at the two models and remove redundancy and converge on a single view from an enterprise perspective," Nisbet said.

Despite IBM's promise to bring consistency to the models, at least one user of Repository Manager is disappointed by the current differences.

According to Gerbracht, the inconsistency could pose a big problem in Merrill Lynch's development and planning efforts. "The reality here is you've got one being built in Santa Teresa and the other in Raleigh," he said. "That's the problem."

IBM offers some AD/Cycle revelations

BY ROSEMARY HAMILTON
CW STAFF

CHICAGO — IBM last week provided a few new peeks into its AD/Cycle strategy that showed its determination to promote applications development as a centralized, host-based operation.

At the first Repository and AD/Cycle user conference, held here, Robert Lord, a manager in the marketing strategy and support group at IBM's Santa Teresa Laboratory, layered on the following AD/Cycle details:

- There are no plans for a distributed repository.
- IBM will not provide a Repository Manager for the OS/2 platform, even though it is one of the four Systems Application Architecture (SAA) platforms.

• The company will not accommodate a three-tiered Repository Manager environment that would include a server as a middle layer.

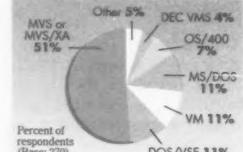
Some observers suggested that IBM's emphasis on large system-based applications development is not in tune with what

many other users want.

"If you talk even to the IBM AIX folks, they'll give you a different view," said Vaughan Merlyn, chairman of CASE Research Corp. "It's not consistent with the market."

Lion's share

IBM's MVS/XA overwhelms other operating systems as the platform of choice for CASE development



Source: CASE Research Corp.
CW Chart: Doreen St. John

An IBM executive who asked not to be identified said IBM's current AD/Cycle target is a shop with at least 100 programmers. "I think it's a fair statement to say that the Repository stays host-based," he said.

The executive said IBM will not build distributed capabilities

into Repository Manager. Eventually, the software will be able to access data stored in a distributed database environment, but it would remain a centralized manager of application development.

While the executive said he is aware that people have talked about OS/2 functioning as a Repository Manager host, he noted that it was never IBM's intent to bring the software down to the workstation level.

"That's inconsistent with SAA, and it is inconsistent with previous proclamations from other IBMers," Merlyn said. "This is IBM trying to sell what it has rather than create other avenues for people."

But the host-based strategy suits some users, such as the IS shop at Depository Trust Co., a mainframe shop with a heavy investment in AD/Cycle. "It fits with where I am going," said Emmanuel Ackerman, manager of data administration. "My workstation needs to be able to talk to the host session. I need a direct link to that."

Repository

FROM PAGE 1

specifications next year. Systemview is intended to provide a similar overall framework for data center operations and systems management.

With different data models, AD/Cycle and Systemview would view and store data differently and therefore not easily share it. "I am very concerned about this," said Ted Gerbracht, group manager of technical services at Merrill Lynch & Co. "To gain the benefits of Systemview, I'd need one model, and then to deal with the other, I'd have to mount up a different model."

Emmanuel Ackerman, manager of data administration at Depository Trust Co. in New York, an early user of Repository Manager/MVS, said the difference between the two environments will not have a near-term effect on his shop but does raise questions as to how successful IBM will be with its enterprise-wide, repository-based scheme.

"The grand view was [the repository] would hold everything for everybody," Ackerman said. "The grand view is a great idea, but what are they doing, cutting us off at the knees?"

A spokesman for Computer Associates International, Inc., which will offer products for both environments, said the company is not concerned about the data model inconsistency. He said CA will rely on IBM-provided interfaces to connect to the two architectures.

IBM officials said last week

Repository Manager/MVS: A standard before its time

CHICAGO — Like DB2 before it, IBM's Repository Manager/MVS is on its way to becoming a standard long before a functional version is in the hands of many users.

The first Repository and AD/Cycle (RAD) user conference was held here last week, and close to 300 users attended, even though few of them have a Repository product from IBM.

Several attendees interview-

ed

ed information engineering as the corporate methodology and is finishing a dictionary project that called for finding all dictionaries in the company and determining what data was useless and what data should be migrated to the Repository Manager.

Other users, however, have just started on the AD/Cycle trek. "I'm hoping I can gain some insight," said Alan Richards, a senior applications support technician at Allen-Bradley Co. in Milwaukee.

ROSEMARY HAMILTON

Netview pricing stymies users

BY ELISABETH HORWITT
CW STAFF

RYE BROOK, N.Y. — Almost two months after IBM unleashed Version 2 of Netview on the world, users are just beginning to discover that they may have to pay a heavy price for the network management system's added functions and features.

IBM's revamped pricing structure is so complex that even IBM sales representatives are reportedly having difficulties figuring it out.

"We had a presentation by our [IBM branch salespeople] last Monday, and we sent them back with a lot of questions," said Jim Kane, a network management services staff member at Aetna Life and Casualty Co. "We have 17 independent Netviews, and we still don't know" whether they conform to the central, distributed or stand-alone options introduced with Version 2, Kane said.

Not all users will pay more for Version 2. IBM has introduced a graduated pricing structure that ties costs more closely to system size — which means price breaks for firms that are running Netview on low-end IBM hosts (see chart).

In addition, the mainframe portion of Netcenter, IBM's gra-

A complicated web

Not all Netview Version 2 prices are the same. Here are examples of what users pay for the latest incarnation of IBM's network management system

Netview Version 2 costs less than Version 1.3 for basic one-time charge for MVS/XA model group 18:

Version 1.3: \$43,050

Version 2 (central option): \$20,950

but more for

MVS/XA model group 50:

Version 1.3: \$107,750

Version 2 (central option): up to \$221,100

A more graduated monthly pricing structure makes Netview Version 2 licensing costs less for

VM/SP model group 10:

Version 1.3: \$934

Version 2 (central option): \$179

but more for

VM/SP model group 50:

Version 1.3: \$1,260

Version 2 (central option): \$3,190

CW Chart: Marie Haines

phics-based user interface, comes free with Netview Version 2, IBM said. Netview Version 1 users had to pay between \$45,130 and \$139,250 for the mainframe portion of Netcenter.

However, firms with multiple Netview hosts may see their charges increase by as much as 200%.

Licensing Version 2 from IBM would take a big bite out of The Travelers Corp.'s information systems budget, said Jim Oleksiw, telecommunications director at the insurance firm.

With his 1991 budget deadline looming ahead, Oleksiw recently tackled the Netview Version 2 pricing structure with a spreadsheet. He said he found that migrating to the new version would cost his company as much as 65% more per year in license charges, "if I run Version 2 the way I am now running Version 1."

Oleksiw originally thought the cost boost would be as much as 116% but revised that figure downward after talking with IBM representatives, he said.

One twist on IBM's new pricing structure is the division of Netview software into three categories, or options: central systems, which can act as focal points for other Netview hosts; distributed systems, which can manage some portion of a customer's installation and also feed into a central Netview; and stand-alone systems, which do not talk to other Netviews.

Trimming down

By making the distributed option of Netview Version 2 significantly cheaper than the equivalent central option, IBM "influences you to have only one, or at most two, central systems instead of many," Oleksiw said.

For example, it would cost General Electric Co. approximately \$15,000 per month to put Netview Version 2 on three high-end central model group 60 hosts but only \$11,200 for one central host and two distributed hosts in the same group, Oleksiw said. "That's \$4,000 savings, which adds up over a year."

Several IS managers said that they have yet to fully analyze Netview Version 2's functionality and pricing to make a purchasing decision.

"A graphics interface would be nice, but we evaluated Netcenter two years ago, and no one wanted to pay for it," said Morty Eison, a voice and data engineer at First Boston Corp. in New York. Another Version 2 en-

hancement, direct LU6.2 support, "would also be nice, but I don't think we need it," he added. "We'll probably do an analysis and decide if it pays to migrate in the next few months."

Several users identified specific Version 2.1 and 2.2 enhancements that they would at least consider paying extra to obtain. Northeast Utilities is extremely interested in the fact that Netview Version 2.2, due out next spring, allows a much broader range of Netview commands to be sent down to an enhanced version of IBM's LAN Manager, according to Stan Pelletier, a computer scientist at the utilities firm.

"Those functions, in my eyes, are worth the extra cash, but I still have to sell it to management," Pelletier said.

None of the major IBM shops interviewed said they were seriously considering backing away from Netview entirely as a result of the price increases.

However, The Travelers will now "look twice at what we use Netview for" and more seriously consider moving network management functions to a local-area network-based platform, Oleksiw said.

IBM has been "approached by a number of customers who want to better understand how the new prices and structure changes affect them" and is working with such users individually, a spokeswoman said.

Thrift bailout group faces systems scrutiny

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Congressional concern about Resolution Trust Corp.'s (RTC) information systems surfaced again last week at a hearing at which the agency charged with cleaning up the savings and loan mess was criticized for its lack of management information and its apparently haphazard approach to acquiring systems.

In March, Rep. Bruce F. Vento (D-Minn.), criticized RTC for lacking a system that would allow it and Congress to evaluate

the success or failure of its asset sales efforts. At the hearing last week, Vento said, "While RTC has made progress in establishing such a system, the information available is still inadequate and . . . serious concerns about the direction of the RTC effort remain. It's enormously important that an adequate system is put in place."

The U.S. General Accounting Office (GAO) said in a recent report that in its haste, RTC had failed to develop a strategic plan or an overall systems architecture to guide it and had not devised the policies, standards and

procedures for systems necessary to meet its objectives.

RTC generally agreed with those criticisms but said it is creating those things in parallel with its systems development efforts. Last month, it answered a major GAO criticism by hiring its first IS chief.

During the next six years, RTC must dispose of an estimated 600 failed thrifts with assets of \$300 billion. So far, RTC has supported that task by cobbling together a number of personal computer-based systems and using systems at other federal agencies.

Meanwhile, the agency put out requests for bids for more permanent solutions, including one for a giant mainframe and telecommunications system to track the management and sale of the real estate inherited from

dead thrifts, which is estimated to number between 200,000 and 300,000 properties. A contract award for that system, called Real Estate Owned Asset Management System (REOMS), is expected in December, and the system is slated to be running by early next year.

Faster, faster

RTC Executive Director David C. Cooke said that the need to quickly obtain data processing capabilities had dictated the agency's approach. He also said that an analysis of the agency's IS needs, performed earlier this year by Price Waterhouse, endorsed the approach of developing separate "feeder" systems and integrating them later into an "overall corporate database."

Cooke said that proceeding with the REOMS procurement before the IS framework is complete entails minimal risk. "There is some possibility that the strategic plan may come up with an entirely new approach, but that's very unlikely," he said.

However, Howard G. Rhile, a division director at the GAO, said, "Time is clearly a factor with RTC. But in developing systems, you either pay now or you pay later."

G. Brooks Dickerson, head of RTC's new Office of Corporate Information, said in an interview

that operational mandates leave him no choice but to turn the normal serial systems life cycle into a parallel process. In addition, he said he will seek to accelerate systems development by using prototyping, fourth-generation languages, highly portable software, software from other federal agencies and heavy use of contractors.

Dickerson said that development of the IS plan and architecture are a top priority for him and that they should be finished in December, at about the time an award for REOMS is made.

The REOMS solicitation asks for an asset management system with a number of features for budgeting, financial monitoring and marketing. It includes a mainframe computer and a nationwide telecommunications network to be accessed by 2,000 users, including RTC staff, financial institutions, other government agencies, asset managers and real estate brokers.

Cooke would not estimate the cost to acquire REOMS, but he said a rough estimate of the annual cost of operating and maintaining it was in the range of \$20 million to \$25 million.

Cooke said that procurement time will be about 10 months, compared with the two to five years typically required in other big federal government system purchases.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
*Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1988 by CW Publishing Inc. All rights reserved.*
Computerworld can be purchased on 35 mm microfilm through University Microfilms Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: back issues, if available, may be purchased at \$2.00 per issue, plus postage. Call (800) 669-1002.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350.
Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For back issues contact Margaret McIndoe.
Requests for missing issues will be honored only if received within 60 days of issue date.
Subscription rates: \$2.00 a copy: U.S. — \$48 a year; Canada — \$110 a year; Central & So. America — \$130 (surface), \$250.00 (airmail) a year; Europe — \$195 a year; all other countries — \$295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

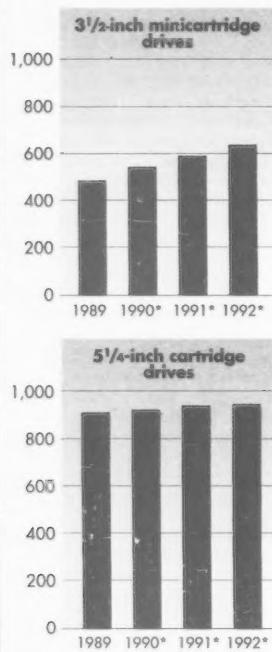
TRENDS



Tape Drives

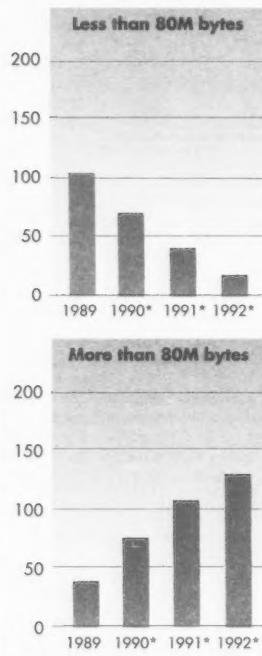
The markets for data cartridge and data cassette drives will continue to hold their own in the short term despite the optical threat

Data Cartridge Tape Drives
Worldwide shipments (in thousands)



Combined shipments of all classes of data cartridge drives are expected to experience 14% growth by 1992. Those drives in the high-capacity range — above 70M bytes for a minicartridge and above 80M bytes for a full-sized cartridge — will be in greatest demand

Data Cassette Tape Drives
Worldwide shipments (in thousands)



Market growth for cassette drives will be on the modest side; shipments are even expected to drop off after 1992

*Projected

Source: Freeman Associates, Inc., Santa Barbara, Calif.

CW Chart: Doreen St. John

NEXT WEEK

Even though many programmers and software developers consider themselves artists, reality suggests otherwise. New fears that the U.S. is trailing other nations in innovation has sparked a fledgling interest in creativity among IS professionals. See In Depth for simple techniques that can yield immediate results.



Product pricing can be a bloody business. Many a good product and good company have fallen as a result of miscalculations about how much customers will spend or just how low competitors' prices might go. Information systems can be a powerful weapon on the pricing front. Find out more about this in Executive Report.

INSIDE LINES

Sounds good to us

An Israeli virus tracker reports that a new virus, called the Saddam Virus, has popped up on bulletin boards in Israel. The virus apparently displays the following message on IBM Personal Computers and compatibles running MS-DOS 2.0 or higher: "Hey Saddam, leave quietly before I come." The virus, which is believed to be a strain of the Stupid virus (no kidding), is not widespread.

By invitation only

Christmas Con, a confab of hackers, will get under way in Houston sometime in December, according to Micron, a hacker who knows about these sorts of things. The last hacker con, held in St. Louis in 1988, drew the attention of the U.S. Secret Service, which spent much of the time secretly videotaping the event. This time around, all participants will be carefully screened, and no camera of any sort will be allowed, Micron said. "Anybody who is anybody" in the hacker underground will be there, he promised.

Parlez-vous ISDN?

While a number of countries (including Uncle Sam) have bits of ISDN here and there, France Telecom will announce this week what it claims is the first "true end-to-end ISDN service" — in France, of course. When will ISDN become a trans-national as well as an international networking standard? Tune in next year, or the year after that perhaps.

Who's the fastest on the draw?

The New York PC Users Group last week entertained Borland Chairman Philippe Kahn and Lotus Chief Executive Officer Jim Manzi on different nights. The dueling duo proved they can cross swords in and out of the courtroom. Kahn warmed up the crowd by matching a speedy Quattro Pro with a sluggish 1-2-3 Version 3.1, but Manzi followed up with the speedier tongue: "Who knows what that Borland operator was trying to load up on Monday? It could have been anything from the New York City budget to Philippe's expense account. For either one, 14 minutes isn't bad," Manzi said, warming up for the kill. Manzi claimed it's actually much faster to load up or recall on 1-2-3 Version 3.1 but that the Quattro demonstrators didn't use the right keystrokes. "You'd think that by now, Borland would be more familiar with the 1-2-3 command structure," he zinged. Lotus is suing Borland for copyright infringement on 1-2-3's menu.

Re-emulation

Phaser Systems, Inc. is working on software that would have IBM mainframes emulate Novell local-area network interfaces on its terminals. Executives at the South San Francisco, Calif., company say they could be within a year of evening out the micro-to-mainframe world. The result would be, among other things, the ability to manage Novell LANs from an IBM terminal.

Last stop, the Computer Museum

Collectors have until Dec. 1 to pick up one of the remaining copies of the VP Planner spreadsheet family from Paperback Software International. "Some people will want to buy the product before it's gone, and it may be that other buyers recognize a good product," said a Paperback spokesman. And there is the possibility of a sympathy vote. "I suspect some new buyers may just be unhappy with the overall outcome of the litigation," he added, noting that Paperback feels the judge went too far in its ruling against Paperback in a copyright suit filed by Lotus.

Lotus kicks off a separate copyright trial against Mosaic Software this week. According to Lotus attorney Hank Gutman, Mosaic has conceded its twin spreadsheet was copied from 1-2-3 but claims that an unidentified Lotus employee gave verbal permission back at Comdex/Fall '84. "We refer to this as the 'visitation,'" Gutman quipped. You can visit here without fear of legal retribution. Confidential info can reach News Editor Pete Bartolik by phone (800-343-6474), by fax (508-875-8931) or via MCI Mail (address: COMPUTERWORLD).

Computer networking that's simpler than ever.

OS/2 can do!

Seamless connectivity. Every business wants it. And every business will experience the limitations of trying to achieve it with DOS. But OS/2® Extended Edition (EE) was designed for connectivity and provides the flexibility you need today and tomorrow.

Now, you may only want to share a laser printer on a LAN configured with Token-Ring or PC Network. With OS/2 and OS/2

LAN Server, it's simple. Later, when you need to do more, like access a host or an Ethernet® network, you can, since OS/2 EE has these functions built in. And by adding IBM TCP/IP software, you can even access multivendor networks from your computer.

But best of all, when you combine OS/2 EE with IBM's Micro Channel™ and its interrupt-handling capability, you can run several communications sessions at

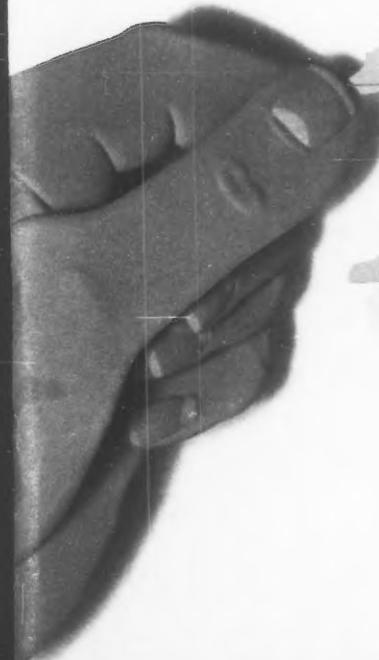
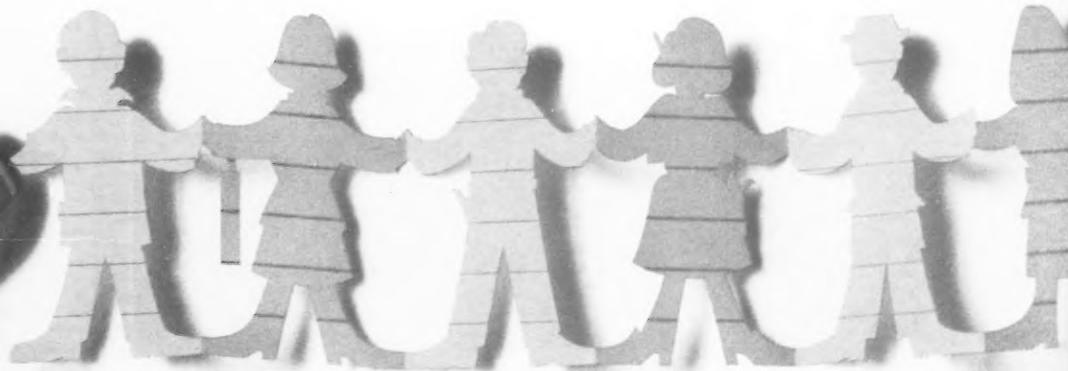
once—without sacrificing reliability, even during peakload conditions.

Want to simplify your computer networking? With OS/2 Extended Edition, the solution is IBM.

Find out more about OS/2. Contact your IBM Authorized Dealer or marketing representative. For a dealer near you, call 1 800 IBM-2468, ext. 197.



IBM



It's not surprising that two can sometimes accomplish things that one never could. What is surprising, however, is just how beneficial the merger of McCormack & Dodge and Management Science America (MSA) promises to be.

Together they are combining their talents and energies, along with an unprecedented wealth of experience, to form D&B Software.

On March 1, 1990 MSA Software merged with McCormack & Dodge

To Become Dun & Bradstreet Software.

With more than one-third of the staff committed to servicing and enhancing your existing software, D&B Software will thoroughly protect your investment. And the company works with more than 10,000 customers worldwide. That means unmatched proficiency in dealing with problems, and knowing what works and what doesn't while raising customer satisfaction to new heights.

The merger will have unexpected benefits in other ways as well. The R&D budgets and expertise of the two companies are now combined. So you can be assured that D&B Software is extraordinarily equipped to help you navigate the tremendous technological changes that lie ahead. Doing so by enhancing current products. And by providing clear migration paths to the next generation of software. D&B Software will also make certain you aren't left behind in an increasingly global marketplace. Because, with the resources of two companies, your needs can now be attended to in more than 60 countries with a network of seasoned company representatives. And the software solutions themselves are designed to operate worldwide and on multiple hardware platforms.

D&B Software is the largest applications software and services company in the world. With the biggest capacity for doing whatever the customer requires. And doing business with a stable, reliable company such as D&B Software, with the full backing of The Dun & Bradstreet Corporation, will allow customers to do something they've always wanted to do. To concern themselves more with the business at hand. D&B Software. The happy result of a merger. And living proof that when two become one, extraordinary things can happen.

Occasionally, Mergers Produce Results That Either Party Would Find Impossible To Produce On Their Own.

For more information about a most welcome addition to the world of software, call (404) 939-NFO.

D&B SOFTWARE



